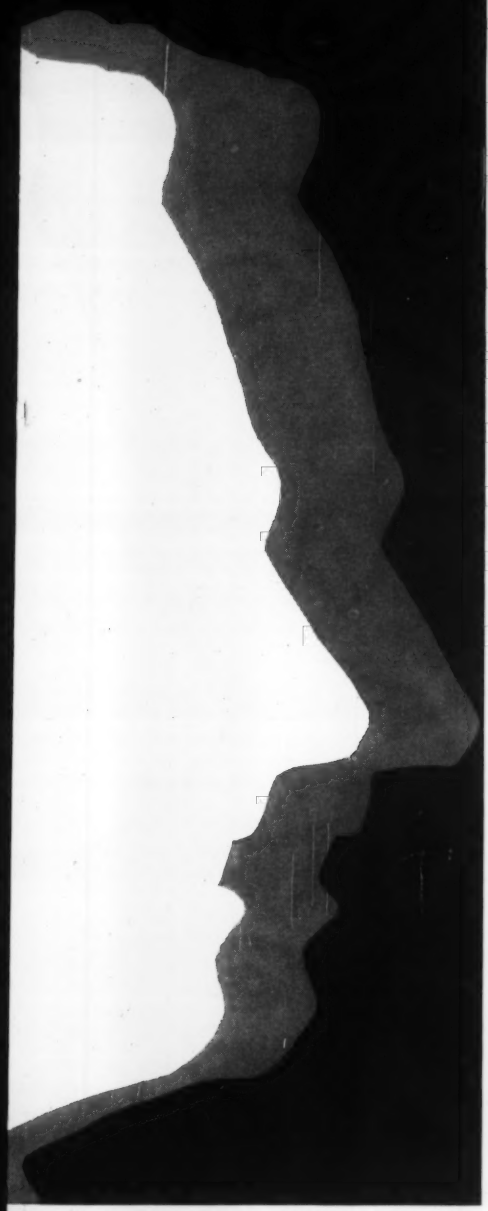
FEBRUARY 16, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Page 100 . . .

Why Antitrusters Hit GM, Steel

Page 148 . . .

Electrical Industry: Growth Market for Metalworking

Page 150 . . .

Machine Forms Complex Tube IDs

Page 152 . . .

Restrike Helps Malleable Castings

Page 191 . . .

10% More U.S. Wire Cloth in '59

Page 93 . . .

Steel Buyers See Strike . . .

STEEL survey of 200 purchasing agents shows: 96 per cent expect walkout—probably 6-8 weeks. They're building inventories as much as 50%.

Profile of Metalworking's Managers . . .

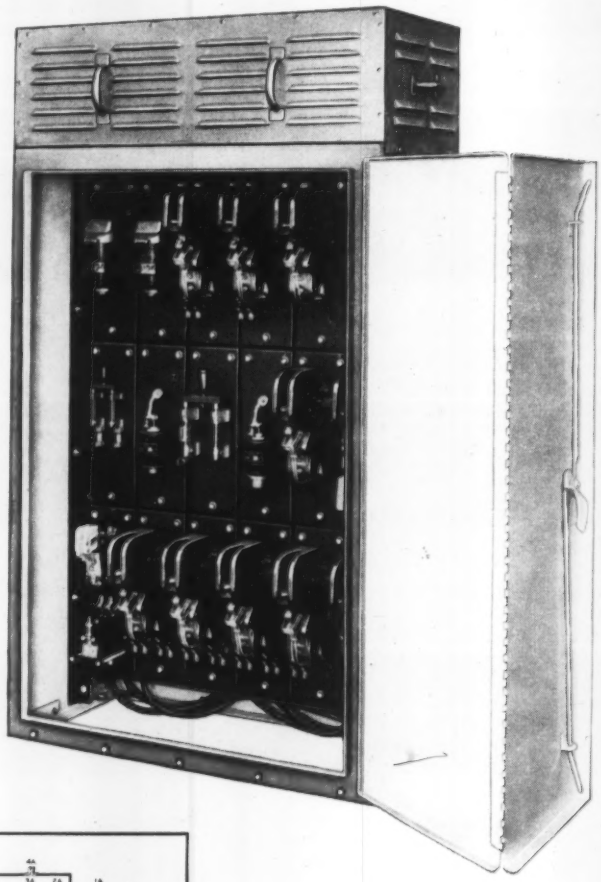
STEEL starts its 1959 Program for Management with a comprehensive look at how managerial jobs are growing in importance, complexity, number, and responsibilities.

—PAGE 137

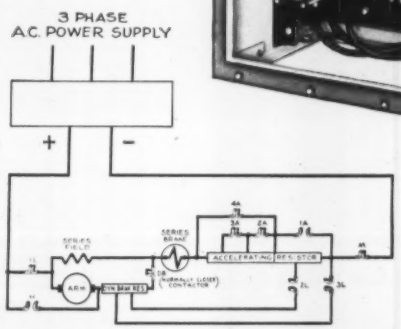
A PROGRAM FOR MANAGEMENT 1959 . . . No. 1

CONTENTS — PAGE 5

NEW EC&M HOIST CONTROLLER provides DC performance on AC power



- **Series Motor**
- **Series Brake**
- **Power Limit Stops**
- **4 Trolley Collectors**



• Now you can have all the advantages of DC crane hoist control on AC cranes. EC&M's new Form HWR controller employs highly efficient, dependable silicon rectifiers to supply DC power to a series-wound hoist motor and its series-wound brake. The circuit used in the new HWR controller is the EC&M Wright dynamic lowering circuit, featuring outstanding simplicity, safety and performance. Positive over-hoisting protection, providing dynamic braking, is offered by Youngstown limit stops.

The silicon rectifiers are compact and are mounted on the top of the controller. They supply power for the hoist and their inherent "blocking" characteristic automatically increases the motor stability for safe lowering of extreme overloads.

This combination of silicon rectifiers and the Wright circuit means less maintenance because load-retarding and load-indicating devices mounted on the trolley are unnecessary. Accurate control of *any* load in lowering is provided. The circuit itself is simple to understand. No crane controller is easier to inspect or maintain. Series brakes and power limit stops are mechanically and electrically safer.

• • •

For refined hook performance on AC powered cranes, get the facts on EC&M's Form HWR control.

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO

2325

IF ALL THE PROCESSING EQUIPMENT

OF ALL THE STEEL SERVICE CENTERS

WERE PUT IN ONE PILE,

EVEN A MOUNTAIN GOAT COULDN'T CLIMB IT!

BUT, FORTUNATELY, THIS EQUIPMENT

ISN'T IN ONE PILE.

IT'S DIVIDED AMONG THE COAST TO COAST NETWORK

OF STEEL SERVICE CENTERS.

"TAILORING" STEEL TO YOUR REQUIREMENTS --

CUTTING, SAWING, BURNING, SLITTING, SHEARING --

IS JUST ONE OF THE MANY SERVICES

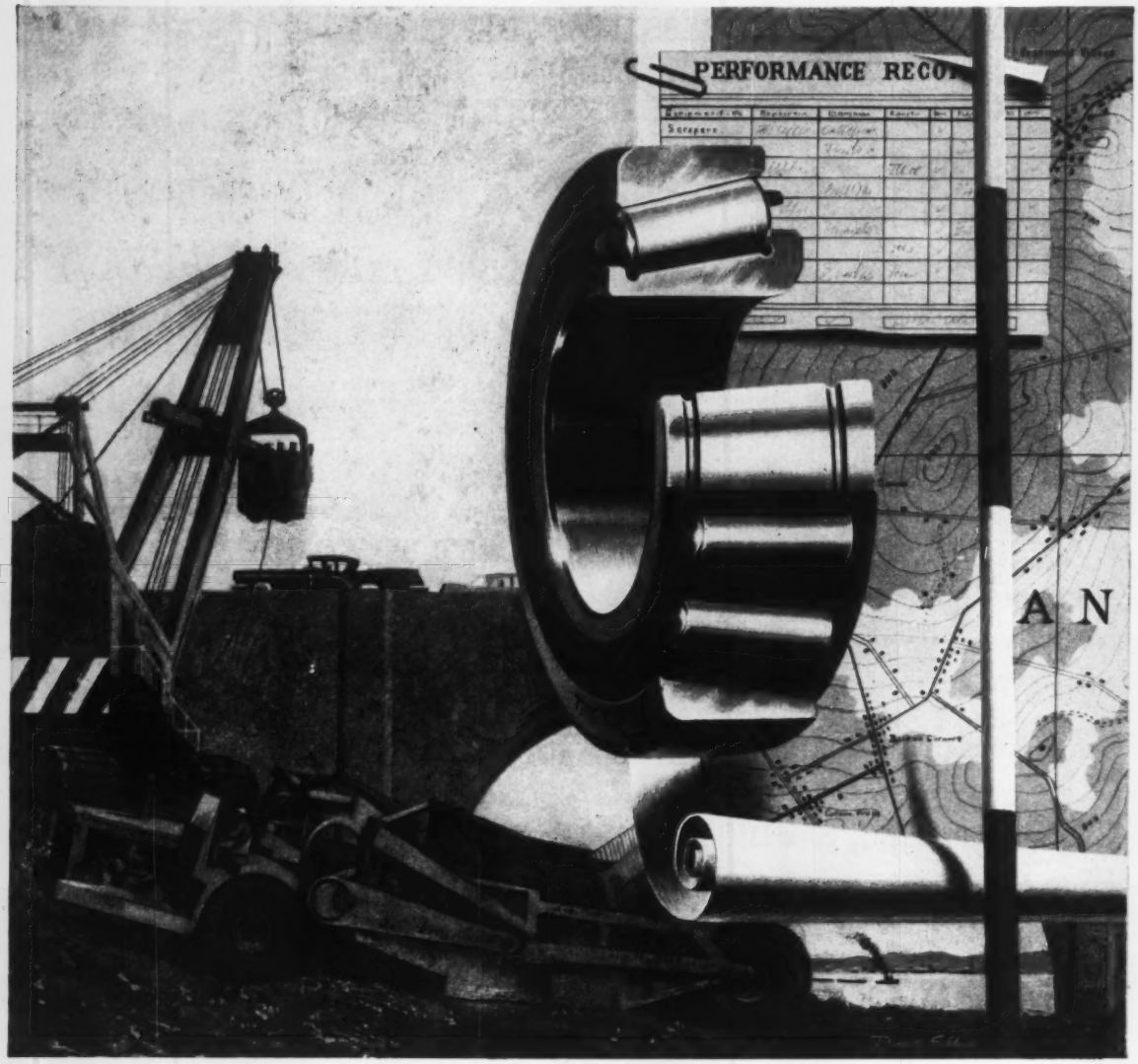
OF YOUR LOCAL STEEL SERVICE CENTER.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Bethlehem Pacific Coast Steel Corporation,
San Francisco

BETHLEHEM STEEL

BETHLEHEM STEEL



Parts determine performance

Few parts make as big a difference in product performance as the bearing. For the right bearing in the right place helps improve over-all performance — prevents breakdowns and high maintenance costs. Where can you get impartial assistance in choosing the right bearing? Call SKF. No other producer offers as much experience in improving product performance with bearings as SKF, makers of the most complete line of ball and roller bearings. 5909

Spherical, Cylindrical, Ball, and Tyson *Tapered Roller Bearings*

EVERY TYPE—EVERY USE

SKF®

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

®REG. U. S. PAT. OFF.

You can HOLD THE LOAD while you change coils on CLARK DC BRAKES

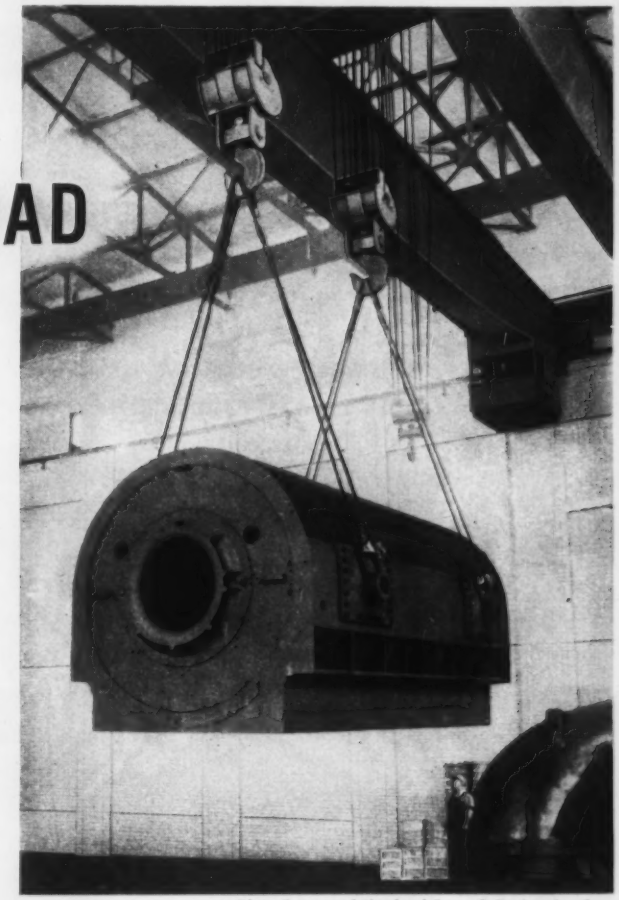
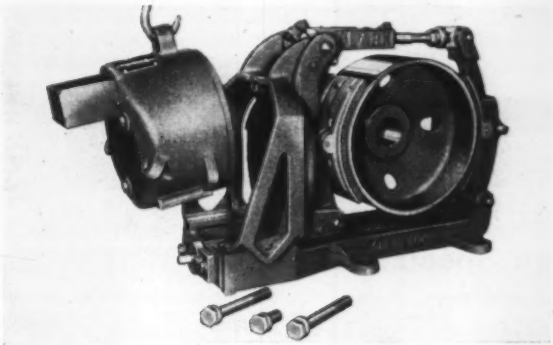
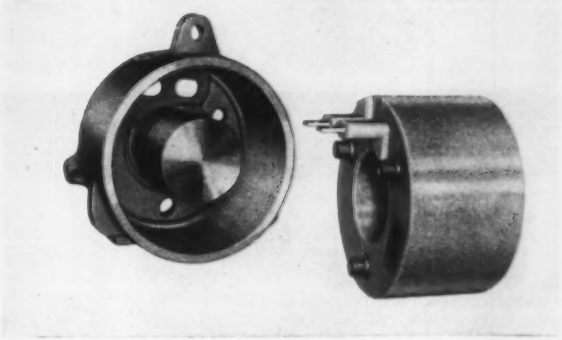


Photo Courtesy of Cleveland Crane & Engineering Co.

On the new improved line of Clark AISE-NEMA DC Magnetic Brakes, you can remove and replace the magnet case and coil as a unit, without releasing shoe pressure or disturbing any brake adjustment. ***Full torque remains applied to the wheel at all times.*** This exclusive feature is particularly important for added safety and convenience on crane applications, especially when loads are being carefully spotted or are suspended over areas where lowering is impractical or impossible.



By removing 3 bolts, magnet case and coil can be removed on the job without disturbing any other part of the brake. Full torque is maintained.



Epoxy-encapsulated coil is easily removed from magnet case by loosening 3 retainer bolts (4 on larger sizes) allowing coil to slide out.

Clark AISE-NEMA Brakes are now available in 5 sizes, from 10" to 23". For complete information, write for Bulletin 106-B.

The **CLARK CONTROLLER** *Company*

Everything Under Control **1146 East 152nd Street • • Cleveland 10, Ohio**

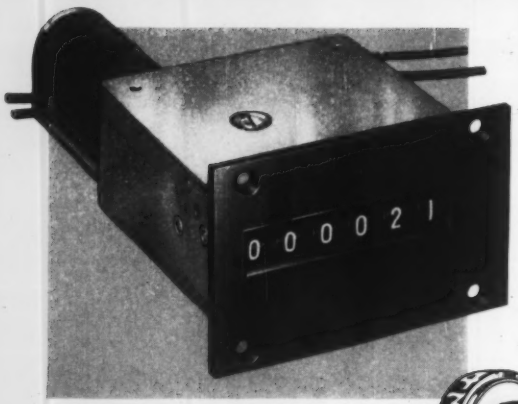
IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

You don't have the answers ...unless you have

FACTS-IN-FIGURES

"Box-car figures" are no good when the heat is on, and you have to know *exactly*. But when your production machines and processes are equipped with Veeder-Root Counters, you always have *all* the answers at your fingertips . . . correct to the last decimal point. For these precision counters count *anything* in any units desired, at speeds up to 300,000 counts per minute . . . manually, mechanically or electronically. And — *built into your products* — they will give the same advantages to your customers. Let us show you what Veeder-Root *Count*rol can do to cut your costs, and build your sales and profits. Write:

You always "Know the score" when you count on Veeder-Root!



NEW Panel-Mounted, High Speed Electro-Magnetic Counter

Series 1591 Counters are ideal for DC applications requiring accuracy and long life at very high speeds. 4 or 6 figures. Instant pushbutton reset or remote electrical reset.

Electrical Contactor

Assures positive actuation of 1591 Counters. Drive by lever or forked coupling.

Everyone can Count on VR®

Veeder-Root Inc.

HARTFORD 2, CONNECTICUT

Hartford, Conn. • Greenville, S. C. • Altoona, Pa. • Chicago
New York • Los Angeles • San Francisco • Montreal
Offices and Agents in Principal Cities

This Week in STEEL

The Metalworking Weekly

February 16, 1959
Vol. 144 No. 7

EDITORIAL 91

Foreign builders threaten this country's machine tool industry. Three solutions are suggested.

SPECIAL FEATURE 137

The role of the metalworking manager is changing. Authority and responsibility are being decentralized. The trend will accelerate as technology and the economy rocket to new heights. The challenge to you, as a member of middle management, is to recognize the change and keep pace with it.

WINDOWS OF WASHINGTON 102

Democrats now feel strong enough for all-out attempt to get a long range power program through Congress.

MIRRORS OF MOTORDOM .. 111

Station wagons have snared so much of the market so quickly, further penetration will come hard.

THE BUSINESS TREND 115

Recovery hits first plateau. It'll be two or three months before gains like last fall's will reappear.

WHERE TO FIND—

Behind the Scenes 6
Letters to the Editors 10
Editorial & Business Staffs .. 16
Calendar of Meetings 23
Men of Industry 119
New Products 169
New Literature 186
Advertising Index 218

Business—

METALWORKING OUTLOOK 85

☑ 96 Per Cent of Steel Buyers Expect Strike, STEEL Survey Shows .. 93
U. S. Steel's Cooper To Be Steel's Chief Bargainer 96
USW Revives Its Whitecollar Drive—Aimed at technical workers 96
Houston Firm Asked to Import Hearings—Sheffield sends reply 97
World Steel Capacity Up 25 Per Cent Since '55 97
Congress Probes Practices in Air Force Missile Program 98
☑ Why and How U. S. Antitrusters Take New Aim at GM and Steel 100
Miami Woos Light Industries—Big ones will find city cold 105
Engineer Shortage To Recur; Counter It with Creativity 108
Electric Utilities' Capital Spending in '59: $5 Billion 125
☑ Profile of Metalworking's Managers—The role is changing 137
No. 1 in STEEL's Program for Management

Production—

TECHNICAL OUTLOOK 147

☑ Electrical Industry Offers Growing Market for Metalworking ... 148
☑ Now You Can Form ID Profiles—Tooling relatively inexpensive 150
☑ Restrike Improves Malleable Castings in Many Ways 152
Machine Topics—Builder Answers Challenge 154
Progress in Steelmaking—Basic Open Hearth Roofs Cut Cost 156
Brazing Furnace Pays Off—Hikes output 200 to 1500 per cent .. 161
Boring Machine Saves Over $50,000 in First Year 164
Better Tools and Methods Reduce Welding Rejects 166
Office Files Solve Assembly Problem—Used for small parts 167

Markets—

MARKET OUTLOOK 189

Complete Index to Market News and Prices 189
☑ Wire Clothmakers Are Optimistic—See 10 per cent volume rise .. 191
New Code Numbering System Simplifies Nail Ordering 192
Steelworks Operation Chart and District Ingot Rates 198
Scrap Stalls After Brief Advance 211
Nonferrous Metals—January Zinc Sales Fall 214

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1959 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

Index available semiannually. STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

Rx FOR TIRED MACHINES

PATIENT: Style 215 Precision Boring Machine—built in 1939.

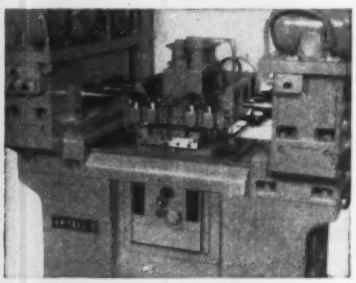
SYMPTOM: Speeds too slow for modern production, tooling outdated.

DIAGNOSIS: Continuous duty from 16 years of heavy work.

CURE: Ex-Cell-O Machine Renewal and Repair Service.

RECOVERY: Fast, complete, guaranteed.

FUTURE: Longer life, "like new" performance.



This 16-year-old Precision Boring Machine, recently rebuilt and retooled by Ex-Cell-O, is back on the job, giving profitable, "like new" service. Renewal or modernization of standard or special machines by Ex-Cell-O experts restores original precision and greatly extends the value of your investment. The service is quick, the workmanship thorough, and your complete satisfaction is guaranteed. Call your local Ex-Cell-O Representative, or write direct for full details.

XLO EX-CELL-O FOR PRECISION
58-52

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

behind the scenes

Complicated Casting

Because several large foundries reported that they are using Cecostamp drop hammers to form, bend, or coil malleable castings, STEEL assigned Machine Tool Editor Robert Huber to look into the matter. Rapid Robert came up with a story about it (Page 152) which aside from revealing how foundrymen cut manufacturing costs, gives us an opportunity to relate a true story accenting the peculiar worth of malleable castings.

Many years ago, when the late Pat Dwyer, long time engineering editor of *Foundry* (a Penton publication) was foundry superintendent at the Dominion Iron & Steel Co., Sydney, Nova Scotia, one of the top executives summoned him. "You," said the great man, "are Mike Dwyer, are you not?"

"Yes, I am not," replied the foundryman. "I am Patrick Dwyer. Tell me quick — am I a former employee?"

It came about that the great man owned a carved plaster-and-wood frame for a mirror, about a foot square, and it was falling to pieces. The thing bore Egyptian motifs and hieroglyphics in bas-relief, and a sort of a shoehorn effect resembling a snake hung down from the top. The owner inquired if Dwyer could make a casting from it.

Several days later Dwyer again was ushered into the presence. He handed over a sharp, clean casting of the mirror frame (see cut), and calmly accepted a cigar. "Marvelous!" cried the great man. "But how in the world did you pull the pattern from under the snake's head?"

"I cast the whole thing flat," Patrick explained, "in a cope and drag. After it was heat treated, I gave the snake a couple of belts with a hammer to bend it over the frame, and it's amazing, so it is, how much he resembles Oliver Cromwell!"

Model Representative

The art of illustration is a demanding art; good models are hard to come by, too. Matthew Brady used tired Union troops; Velasquez often used the king's spaniels; and Whistler used his own mother. Surely, in view of these precedents, STEEL should be permitted to use its own salesmen!

You are all familiar, of course, with STEEL's mighty helpful and informative feature "Metalworking Outlook." Associate Editor George Howick assembles this industrial news digest each week, and its high readership often makes him sweat (although George would prefer perspire) with responsibility. Indeed, "Metalworking Outlook" is read by more metalworking men in one week than the combined writings of Milton, Jean Paul Sartre, and Gene Stratton Porter.

On Feb. 2 the Outlook carried an item (Page 40) revealing that it probably costs your company $50 to $60 each time a salesman calls on a prospective customer. The item was illustrated by a standard shot of a salesman waiting in a reception room. The gang at General Steel Castings, Granite City, Ill., examined the illustration and sent this question:

"How many observers observed that the salesman (is he really, or is he just a model posing?) on Page 40 of this week's issue is using a copy of STEEL to help him sell?"

Well, now, cats and chicks, that boy ain't just a model posing. He is STEEL's own representative from Rochester, N. Y., Harold A. Dennis. When the call was sounded for an illustration to fit the item, the editors ignored celebrated models, like Union troops, royal spaniels, and Whistler's mother, and settled for a good shot of Hal Dennis. The print was in STEEL's files, and in good condition, too.

Smoke Signals

An entirely uncalled for comment comes to mind after learning about the Los Angeles firm that uses an aluminum chip cleaner (Feb. 9, p. 85) to clean chips before they are remelted. Uncleaned chips give off a lot of smoke and fumes—and as you know, those are naughty words in the Los Angeles area. The technique described in the story will interest other firms troubled with smoke abatement problems. Oh—the uncalled for comment was that if the Indians had treated buffalo chips that way, the technique would have wrecked aboriginal communications all over the Great Plains.

No Detours

Three bus lines in Ohio run from Ashtabula to Gnadenhutten, and four from Gnadenhutten to Wapakoneta. How many choices of routes are possible from Ashtabula to Wapakoneta via Gnadenhutten?

Shrdlu

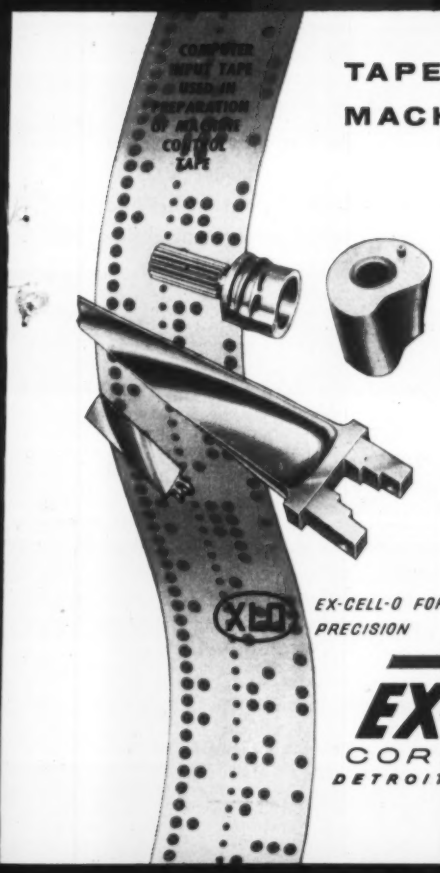
(Market Outlook—Page 85)

This is a 3-axis machine controlled by magnetic tape for generating the airfoil areas of steam turbine and jet engine blades.
EX-CELL-O
NUMERI-TROL

NUMERI-TROL

59-3

TAPE CONTROLLED PRECISION PROFILING MACHINES BY EX-CELL-O



FIRST to provide 360° work rotation for 3-dimensional machining of complex parts

FIRST to combine grinding, dressing and dressing compensation with milling

Numeri-Trol puts a new dimension into machining. Lead time goes down, tooling costs and machining time are cut in production of prototypes and complicated precision parts. Lateral movement of the work head and transverse travel of the cross slide combine with rotary work feed to permit milling and finish grinding impossible or uneconomical by ordinary standards. Wheel dressing and dressing compensation are fully tape-controlled. Numeri-Trol machining includes rotary and longitudinal milling with automatic work feed and 360° indexing.

Have a part that is costing too much to make? Find out how Numeri-Trol can produce it—economically! See your Ex-Cell-O Representative or write direct.

EX-CELL-O CORPORATION *Machinery Division*
DETROIT 32, MICHIGAN

EX-CELL-O PRECISION PRODUCTS INCLUDE: MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • TORQUE ACTUATORS • THREAD AND GROOVE GAGES • GRANITE SURFACE PLATES • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

CIMCOOL PRESENTS . . .

CIMPERIAL

Here is what we believe to be the most advanced, the most effective cutting fluid in the history of the industry.

CIMPERIAL is an entirely *new* chemical concentrate *especially designed for heavy duty applications.* It is the only water-miscible fluid capable of performing the tough, low clearance, low speed operations previously limited to cutting oils.

CIMPERIAL is a *chemical solution*—not an emulsion—which effectively covers 95% of all metal cutting jobs.

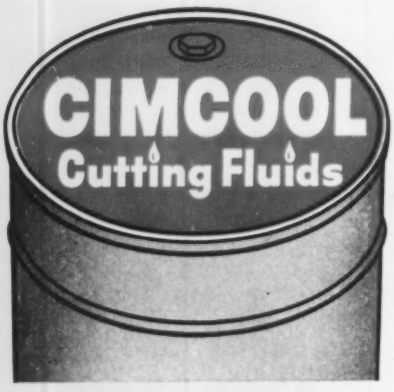
CIMPERIAL increases tool life because it defeats both heat and pressure. Forming a chemical solution in water, CIMPERIAL rapidly dissipates heat. Won't "hold" the heat as an oil will. CIMPERIAL contains newly discovered EP (Extreme Pressure) additives which give you more cutting action with less force. Result: *production equal to, or better than, oil; and working conditions vastly improved.*

Note these important advantages:

CIMPERIAL lasts longer. It won't turn rancid: it contains no food for bacteria and has a remarkable bactericide to control those bacteria that do enter the mix from outside sources. No more Monday morning odor. Less frequent coolant changes mean lower costs, less down time for machines.

CIMPERIAL is productive and clean. The *new* EP chemicals reduce the cutting forces and friction on the tool: in one case CIMPERIAL has already increased tool life 70%. It also has high film strength for lubricity characteristics better than oil. And there is no smoke or vapor around your machines.

CIMPERIAL controls rust. You get *two* types of chemical rust inhibitors in CIMPERIAL . . . which form both *polar* and *passivating* films over metal surfaces. This gives you, even at lean dilutions, double protection against corrosion.



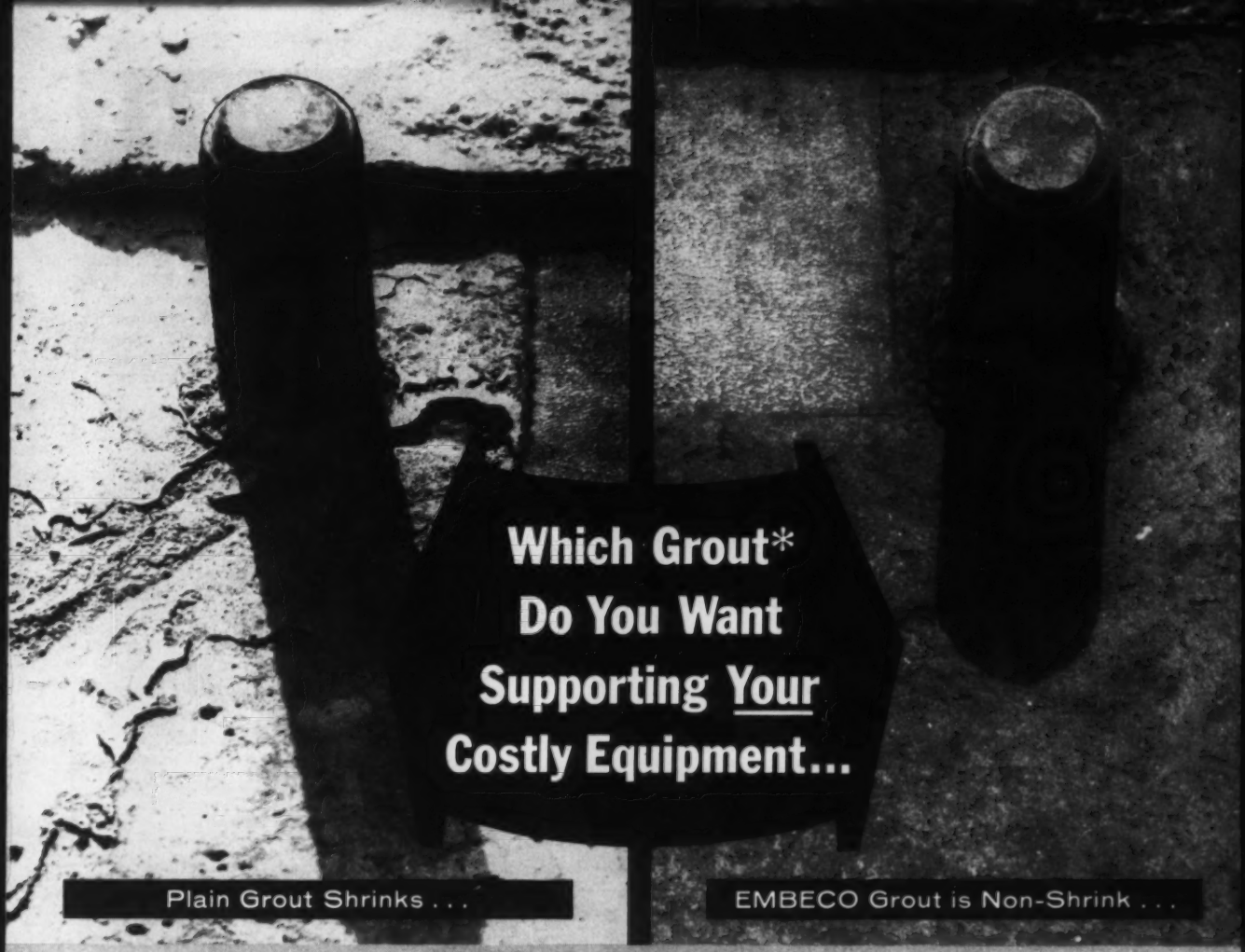
FOR 100% OF ALL METAL CUTTING JOBS

Production-proved products of The Cincinnati Milling Machine Co.

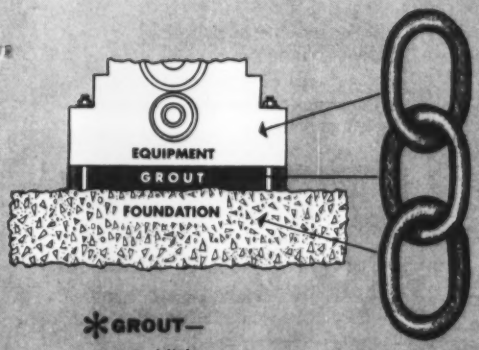
CIMPERIAL—*newest* in the famous, industry-proven line of CIMCOOL® Cutting Fluids!
CIMCOOL 52 Concentrate—The pink fluid which covers 85% of all metal cutting jobs.
CIMPLUS—The transparent grinding fluid which provides exceptional rust control.
CIMCUT Concentrates (AA, NC, SS)—For every job requiring an oil-base cutting fluid.
ALSO—CIMCOOL Tapping Compound—CIMCOOL Bactericide—CIMCOOL Machine Cleaner.

For full information on great new CIMPERIAL and the complete family of CIMCOOL Cutting Fluids, call your CIMCOOL Distributor today. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

®Trade Mark Reg. U. S. Pat. Off.



. . . to withstand: IMPACT • POUNDING ACTION • VIBRATION • SIDE THRUST • TORQUE



***GROUT**—
the vital link
between equipment
and foundation

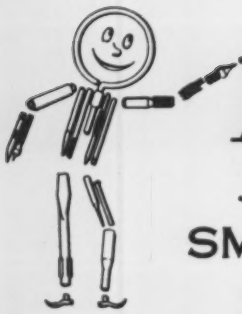
LEFT PHOTO... *Plain Grout* shrinks and leaves only a web of mortar and a small shim area to support bedplate . . . results in a *short-life* grout which causes costly shutdowns, possible equipment damage, and loss of production.

RIGHT PHOTO—*Embeco Non-Shrink Grout* . . . provides full bedplate support, maintains alignment and has high impact resistance . . . is a long-life grout that avoids trouble and cost of untimely re-grouting.

Full information on Embeco Pre-Mixed Grout and "Grouting Specifications"—a valuable guide on machinery and equipment grouting—on request.

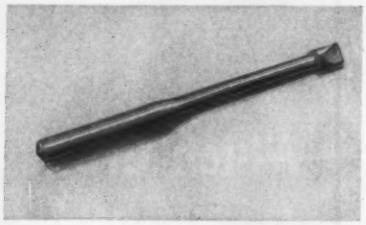
THE MASTER BUILDERS CO.
DIVISION OF AMERICAN-MARIETTA CO

General Offices: Cleveland 3, Ohio • Toronto 9, Ontario • Export: New York 17, N. Y.
Branch Offices In All Principal Cities • Cable: Mastmethod, N. Y.



NEWS
from Torrington on
SMALL PRECISION METAL PARTS

Ordinarily, one would not think of "custom manufacture" and "mass production" in the same breath. Except at Torrington's Specialties Division, where the production of tremendous varieties and quantities of small metal parts of exceptional precision and uniformity is a day-to-day occurrence.



A good example is the valve stem we make for a leading pump manufacturer. Operations include turning, threading, slotting and tempering. Nothing unusual about that, except that Torrington can do it to such precision that the specified finish of 4 to 6 micro-inches is achieved without grinding. This saves our time—and our customer's money, yet every part is produced to perfection.

Another interesting case is an insulated contact pin. It is driven into wood to check moisture content by electrical conductivity. The reduced center section is insulated. The shank must be accurate to ±.0005", and the diameter of the tapered neck to +.005", −.000". Torrington's engineers devised a way to back-swage the neck to required taper and trim square between head and reduced section *automatically.*

The manufacture of such parts as these, in the tremendous quantities required of us every day, demands highly specialized engineering skills. To serve you most efficiently, our Specialties Division maintains a separate engineering department. Staffed with engineers who have wide experience in precision metalworking, the department can help you with any engineering problems that might arise

in the manufacture of your special metal parts. For prompt service, just circle our number on the reply card, call our area salesman or write direct to:

The Torrington Company, Specialties Division, 900 Field Street, Torrington, Conn.

TORRINGTON SPECIAL METAL PARTS

Makers of Torrington Needle Bearings

LETTERS
TO THE EDITORS

Good Training Class Material

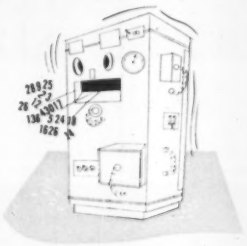
May we have two copies of "Metalworking Managers Expect 9.2% More Sales in 1959" (p. 99), two copies of "The Changing Role of Metalworking Managers" (p. 95), and two copies of "Facts & Figures of the Metalworking Industry" (opposite p. 138) from the Jan. 5 issue of STEEL?

This excellent material can be used to great advantage in our supervisors' training classes.

Otto W. Feierabend

Foreman, 1060 Electrical Area
Allis Chalmers Mfg. Co.
Milwaukee

Will Distribute Facts & Figures



We find "Facts & Figures of the Metalworking Industry" (Jan. 5, opposite p. 138), extremely interesting and useful. We would like to have six copies to distribute to our departments.

R. A. Neate

Chief Estimator
Canadian Steel Improvement Ltd.
Etobicoke, Ont.

• • •

This compilation of information would be valuable to our office.

Carl B. Tufts

Sales Engineer
Marathon Electric Mfg. Corp.
Wausau, Wis.

• • •

This section is outstandingly done. May I have a personal copy?

J. E. Hackbarth

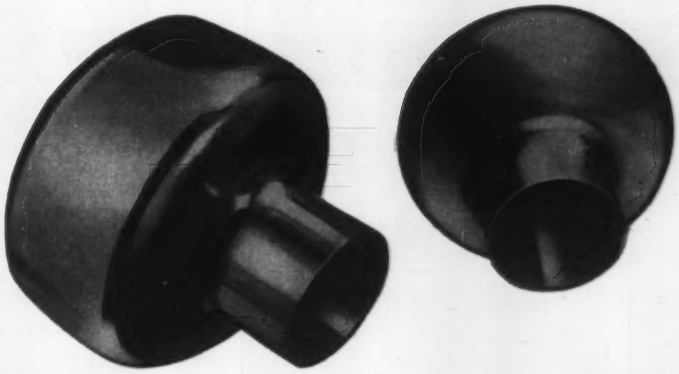
Distributor Section
International Nickel Co. Inc.
New York

Corrects and Adds to Statement

I would like to call your attention to an omission in your edited version of my comments on basic steelmaking (Jan. 5, p. 192). The first sentence of the second paragraph should read: "The *campaigns* on most of the basic roofs installed in 1958 will not be completed until April this year."

It is now possible to add to that com-

(Please turn to Page 12)



4 OF THE MANY STYLES OF THE ONE-PIECE SEAMLESS DOOR KNOBS FABRICATED FROM RUGGED REVERE BRASS STRIP.

REVERE BRASS STRIP

Stands the Gaff!

The one-piece door knobs shown are drawn from a single blank of Revere Brass Strip, presenting an attractively smooth, unbroken surface without the need for seams or welds.

Because they are made by a unique procedure the manufacturer tells us that the brass must stand up under mighty rugged going, and that to produce the quality knobs they do, at an economical production level, the brass they use must have:

1. *Uniformity of gauge.*
2. *Absence of any sign of fracture or crimping when drawn.*
3. *Consistently correct grain structure to insure a smooth, flaw-free surface on the finished knobs.*

The manufacturer also tells us that Revere Brass Strip has been filling that bill, with utmost satisfaction, for some time.

Revere Brass Strip may be able to help *you* make a better product at less cost. You'll never know until you talk it over with one of our TA's (Technical Advisor). There's no obligation, of course. And such a discussion could save you a substantial sum of money. Such has been the case many, many times.

COPPER ★ BRASS ★ 18 01 ★ REVERE ★ ALUMINUM

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

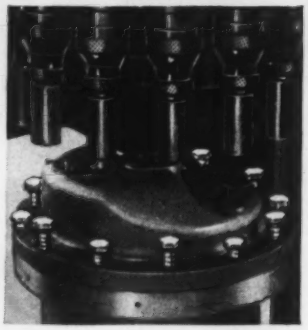
230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Brooklyn, N. Y.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Newport, Ark.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

THE NEED + THE IDEA = THE PRODUCT

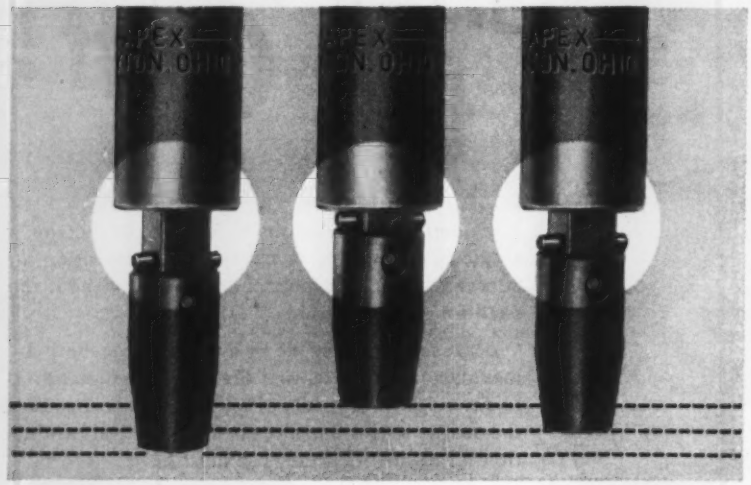
THE NEED

On multiple tool operation, where fasteners are positioned manually, the distances between sockets and mating fasteners will vary. Despite this variance, all the fasteners must be run in simultaneously and securely, without impairing the workpiece, fastener or tool.



THE PRODUCT

APEX CLUSTER SOCKETS



The Apex cluster socket, specifically designed for multiple tool applications, automatically compensates for any variation in fastener height. As the bank of power tools moves up to the fasteners, the spring-retracting action of each Apex cluster socket "levels" the fasteners, insuring uniform, positive seating and eliminating any possibility of cross-threading.

At Apex—the authority on fastening—the need creates an idea, closely followed by a new product. What's your need for special fastening tools? Our new Catalog 30-D lists several Apex "specials", one of which may solve your fastening problem—and your cost problem as well! Write, on your company letterhead please, for your copy.

APEX FASTENING TOOLS

SCREWDRIVING • NUT RUNNING • SPECIAL

The APEX Machine & Tool Co. • 1032 So. Patterson Blvd. • Dayton 2, Ohio

LETTERS

(Concluded from Page 10)

ment. The shift from silica to basic roofs is still accelerating. There are now a number of complete open hearth shops which are committed to this major change for all furnaces. Operating life is being extended so significantly that it is now evident this will become a major factor in gaging the production capacity of American steel plants.

R. E. Birch

Director of Research
Harbison-Walker Refractories Co.
Pittsburgh

What Firms Try Leasing?

I found "More Companies Try Leasing" (Dec. 15, 1958, p. 113) interesting. Of particular interest was the fact that out of the 221 companies surveyed, 30 companies are offering products on a rental basis and 10 are considering the practice. May I have the address of the National Industrial Conference Board so that I can obtain a list of these companies.

E. A. Massey

International Minerals & Chemical Corp.
Skokie, Ill.

• *The board's address is 460 Park Ave., New York 22, N. Y.*

Only One Metallurgist

In the Metalworking Outlook item "Welded Rings Come into Their Own" (Dec. 29, 1958, p. 22) you mention two metallurgists at Dresser Mfg. Co. E. U. Blanchard is a metallurgist. However, H. Collins is product manager.

E. U. Blanchard

Dresser Mfg. Div.
Dresser Industries Inc.
Bradford, Pa.

Excellent Requirement Survey

We consider "Wanted: A Revolution in Manufacturing" (Nov. 24, 1958, p. 100) to be an excellent survey of requirements. We are sending a review presenting some of our comments. This review also indicates the efforts of the Manufacturing Methods Division toward meeting these requirements.

Preston L. Hill

Colonel, USAF
Chief, Manufacturing Methods Division
Directorate of Resources
AMC Aeronautical Systems Center
Wright-Patterson Air Force Base, Ohio

Gains Tooling Knowledge

We feel that STEEL presents excellent technical and administrative information and we gain considerable knowledge for use in tooling from it.

O. L. Rumble

Tooling Manager
Douglas Aircraft Co. Inc.
Long Beach, Calif.

"WEIRKOTE® WON'T PEEL OR FLAKE—AND CAN END THE NEED FOR FURTHER CORROSION PROTECTION AFTER FABRICATION."

Q. A zinc-coated steel sheet that won't peel or flake, even under the severest fabricating stresses?

A. Precisely. Weirkote's made by a continuous process. The zinc is so integrated with the steel that even the toughest "torture" tests of fabrication leave that bonded coating intact. You can work Weirkote to the very limits of the steel itself!

Q. Our products are pretty intricate—take lots of flexing, crimping and so on. What about those hard-to-reach places?

A. Weirkote's zinc coating is so uniform—protects even the most complicated parts.

Q. So with Weirkote you bypass the need for further corrosion protection?

A. You get the picture! Think of the time, labor, space—the costly capital outlay—you save. Better steel products at far lower costs—that's Weirkote for you!

Send for free booklet that details the time-and-cost-saving advantages of skin-tight zinc-coated Weirkote. Just write Weirton Steel Company, Dept. B-2, Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

WHY is chaser hardening important to your threads?

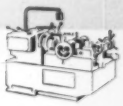
When cutting your threads—long tool life, maximum accuracy, and trouble-free operation can only be assured by proper chaser hardening.

Proper chaser-hardening technique is an important intangible offered you by LANDIS Threading Specialists. For example, LANDIS Tangential Chasers are often given special hardening treatment when workpiece design or material specifications so indicate. Just as with the blacksmith of years gone by, so chaser hardening today is an art. The ability to determine and apply the proper chaser-hardening technique is the result of more than 50 years experience in a single field—THREADING.

Yet—chaser hardening is but one benefit of the extensive technical knowledge and practical experience accumulated through years of specialization. Recommendation on unusual tooling set-ups, automation, new methods, the most efficient type of threading equipment are a few of the many ways in which LANDIS Threading Specialists may be of help.

Whatever your need for generating threads —Cutting, Rolling, Grinding, or Tapping— LANDIS Threading Equipment will accomplish it most efficiently and economically.

When asking about threading information please send specifications.



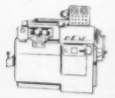
Threading Machines

LANDIS *Machine* COMPANY

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT

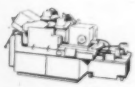
WAYNESBORO, PENNSYLVANIA

Die Heads—
Rotary & Stationary

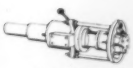


Thread Rolling Machines

Thread Rolling Tools



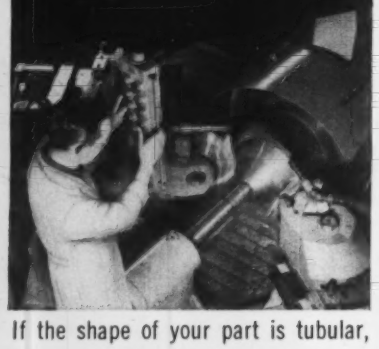
Centerless Thread
Grinding Machines



Taps—Collapsible
& Solid Adjustable

535C

let Ingersoll HYDROSPIN your parts



If the shape of your part is tubular, conical, hemispherical, or curvilinear, hydrospinning by the Ingersoll Kalamazoo Division may save you costly machining expense and time. If you want a seamless part, try hydrospinning. If you want precise wall thickness, turn to hydrospinning. Hydrospinning saves on metal, time and labor.

COMPLETE PRODUCTION FACILITIES

Ingersoll Kalamazoo Division has an experienced engineering staff, and complete hydrospinning equipment. If you have a metal forming problem where hydrospinning may be of help to you, send an outline of your problem or contact the Defense Sales Dept. of

Borg-Warner Corporation

ENGINEERING
B-W INGERSOLL KALAMAZOO DIVISION
PRODUCTION

1810 N. Pitcher St. • Kalamazoo, Michigan

STEEL
the Metalworking Weekly

Editor-in-Chief, IRWIN H. SUCH

Editor, WALTER J. CAMPBELL

Associate Managing Editors, VANCE BELL, JOHN S. MORGAN

WILLIAM M. ROONEY .....Market Editor
ROBERT F. HUBER .....Machine Tool Editor
HARRY CHANDLER .....Copy Editor
GLENN W. DIETRICH....Associate Copy Editor
FRANK R. BRIGGS .....Associate Editor
ROBERT O. JAYNES .....Associate Editor
ROBERT M. LOVE .....Associate Editor
AUSTIN E. BRANT .....Associate Editor
ROSS WHITEHEAD .....Associate Editor
GEORGE J. HOWICK .....Associate Editor

DERRY EYNON .....Assistant Editor
NEIL C. ROBERTS .....Assistant Editor
DONALD E. HAMMERSTROM..Assistant Editor
JOHN TERESKO .....Assistant Editor
WILLIAM M. OLDS .....Assistant Editor
MARY T. BORGERHOFF .....Assistant Editor
MARY ALICE EARLY .....Assistant Editor
EILEEN CORTES .....Assistant Editor
MARY ANN STUVE .....Editorial Assistant
JANE WEDGE .....Editorial Assistant

THOMAS H. BRYAN, TOM WELSH, Art Editors

IRENE KASNER, Editorial Service

Resident Editors

New York 17 .....60 E. 42nd St.
B. K. PRICE, L. E. BROWNE
BRIAN WILSON, H. GLENN CANARY
Murray Hill 2-2581

Chicago 11 .....520 N. Michigan Ave.
ERLE F. ROSS, WILLIAM E. DEAN
Whitehall 4-1234

Pittsburgh 19 .....2837 Koppers Bldg.
WILLIAM V. WALLACE—Atlantic 1-3211

Detroit 35 .....15800 W. McNichols Rd.
A. DONALD POSTMA—Broadway 3-8150

Washington 4 ....1123 National Press Bldg.
JOHN R. BOTZUM—Executive 3-6849

Editorial Correspondents

Buffalo—Emerson 5385 ....GEORGE E. TOLES
Youngstown—Riverside 7-1471..GEO. R. REISS
Cincinnati—Beechmont 1-9607...DICK HAVLIN
Birmingham—Birmingham 3-1121 R. W. KINCEY
St. Louis—Garfield 1-1212. HAMILTON THORNTON
Houston—Hudson 6-5236 .....ROBERT SHIRK
Los Angeles—Webster 5-1234..NORMAN LYNN

San Francisco—Yukon 6-5151 EDWIN HAVERTY
Seattle—Melrose 2-1895 .....R. C. HILL
Toronto, Canada—Empire 4-9655..F. S. TOBIN
Birmingham, England .....J. A. HORTON
Paris, France .....LEON JAUDOIN-PROM
Brussels, Belgium .....PAUL DE KEYSER
Dusseldorf, Germany ....DR. HERBERT GROSS

BUSINESS STAFF

Business Manager, D. C. KIEFER

Asst. Business Mgr.....C. A. TALLINGER JR.
Advertising Service Mgr. ...DORIS MITCHELL
Production Manager .....A. V. ANDERSON
Classified Advertising .....EVELYN DIETZ

Promotion Director .....S. F. MARINO
Market Research Mgr. ....T. M. BALLANTINE
Circulation Director .....J. C. GERNHARD
Distribution Manager .....G. R. EBERSOLE

Reprints, JUNE SCHILENS

Advertising Representatives

New York 17 .....60 E. 42nd St.
K. A. ZOLLNER, GUY LABAW
Murray Hill 2-2581

Wynnewood, Pa. (Phila.) 200 Wynnewood Ave.
WM. J. VERSCHOOR—Midway 2-6512

Farmington, Conn. .....12 Farmstead Lane
CALVIN FISHER JR.
Orchard 7-1756

E. Rochester, N. Y. .....217 Ridgeview Dr.
HAROLD A. DENNIS—Browning 1-2105

Pittsburgh 19 .....2837 Koppers Bldg.
J. C. SULLIVAN—Atlantic 1-3211

Cleveland 13 .....Penton Bldg.
J. K. GILLAM, N. W. MANNING—Main 1-8260

Cincinnati 6 .....2215 Victory Parkway
E. L. FRANKE—Parkway 1-0711

Detroit 35 .....15800 W. McNichols Rd.
DONALD C. HYDE
Broadway 3-8150

Chicago 11 .....520 N. Michigan Ave.
L. C. PELOTT, W. L. POLAND
WM. J. D'ALEXANDER, RICHARD BIRDSONG
Whitehall 4-1234

Los Angeles 36 .....5943 W. Colgate Ave.
F. J. FULLER—Webster 1-6865

San Francisco 4 .....57 Post St.
Robert W. Walker Co.—Sutter 1-5568

Griffin, Ga. .....1106 Pine Valley Rd.
FRED J. ALLEN—Griffin 7854

Clearwater, Fla. .....1954 Jeffords Dr.
H. G. ROWLAND—(Clearwater) 39-9493

Dallas 35 .....818 Exchange Bank Bldg.
JAMES H. CASH—Fleetwood 1-4523

BPA

NBP

Published Every Monday by
THE PENTON PUBLISHING CO., Penton Bldg., Cleveland 13, Ohio
MAin 1-8260

GEORGE O. HAYS .....Chairman
RUSSELL C. JAENKE .....President
FRANK G. STEINEBACH .....Vice President and Secretary
FRANK O. RICE .....Vice President
JOSEPH P. LIPKA .....Treasurer and Assistant Secretary

Also Publisher of
FOUNDRY, MACHINE DESIGN, NEW EQUIPMENT DIGEST, AUTOMATION
Member of Business Publications Audit of Circulation Inc., Society of Business Magazine Editors, and National Business Publications Inc.

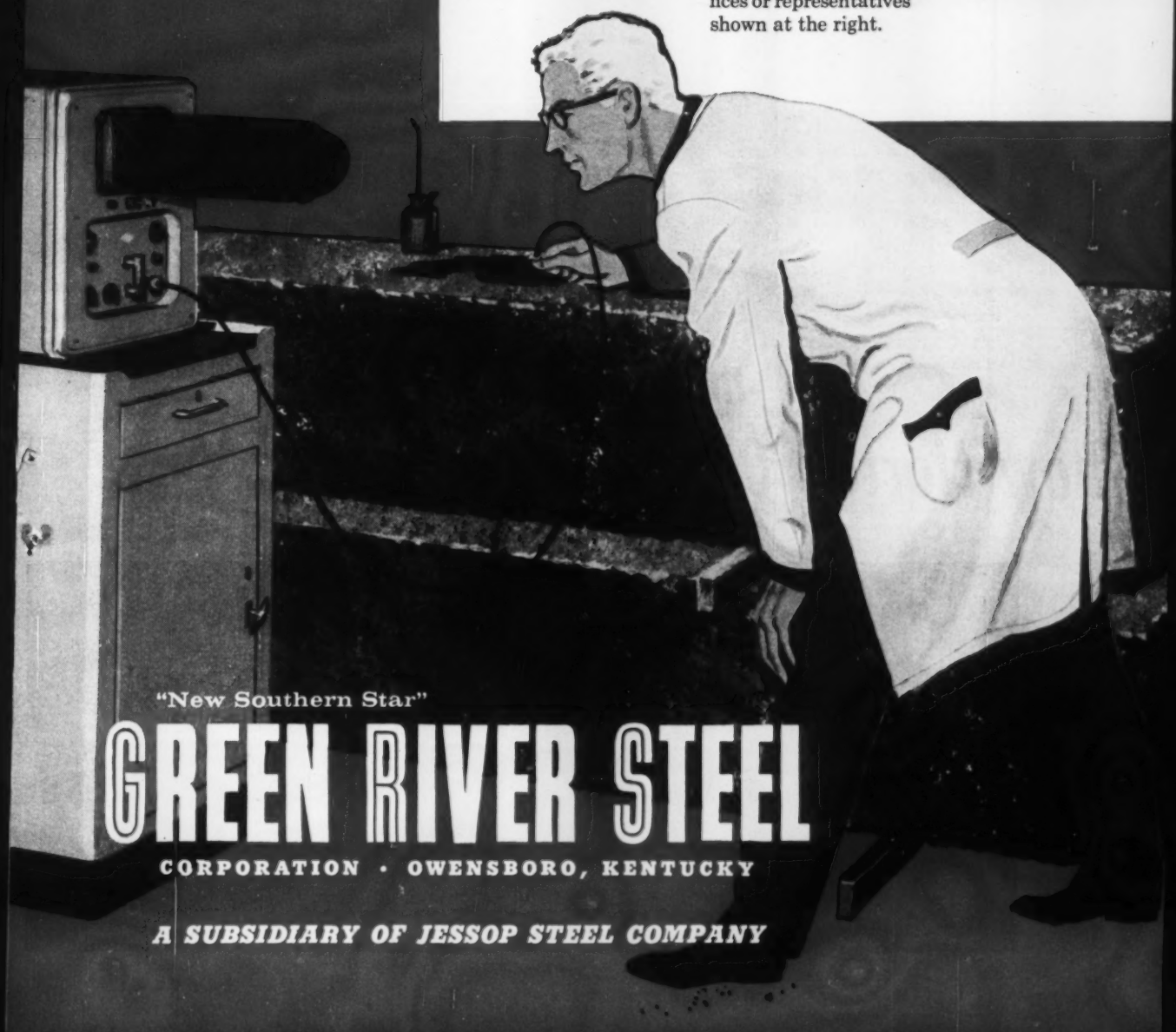
NEWS FOR HEAVY FORGE SHOPS

Green River Steel can now offer forging blooms up to 18″ square with guaranteed sound centers

To answer the consistent need of many good customers, Green River has developed new production techniques which allow it to guarantee sound centers in forging blooms with cross sections up to 18 inches square. These blooms are available in aircraft and commercial grade alloy, stainless or forging quality carbon steels. Each bloom is tested for soundness before shipment, but Green River's patented Macro-Clean process makes rejects extremely infrequent. For further information, contact Green River at Owensboro, Ky., Jessop at Washington, Pa., or one of the Jessop offices or representatives shown at the right.

District Offices
Birmingham, Ala.
Buffalo, N. Y.
Charlotte, N. C.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Detroit, Mich.
Hartford, Conn.
Houston, Tex.
Indianapolis, Ind.
Los Angeles, Calif.
Montreal, Quebec
New York, N. Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Toronto, Ontario
Wallaceburg, Ontario
Washington, D. C.

Representatives
Milwaukee, Wis.
St. Louis, Mo.



"New Southern Star"

GREEN RIVER STEEL

CORPORATION · OWENSBORO, KENTUCKY

A SUBSIDIARY OF JESSOP STEEL COMPANY

The Ingersoll Milling Machine Company

Special Machine Tools

EDSON I. GAYLORD
GENERAL MANAGER

Rockford, Illinois

December 15, 1958

Mr. Everett Hicks
Vice Pres. and General Mgr.
Grinding Machine Division
Norton Company
Worcester 6, Mass.

Dear Everett:

We have just run one of the spindle and drive bar sleeves on our new Norton 18 x 96" Type LC-2 Plain Cylindrical Grinding Machine and I thought you would be interested in the results.

You estimated that this machine would do all the grinding and handling, except loading and unloading, in 350 minutes. Our actual grinding and handling time was 352.4 minutes.

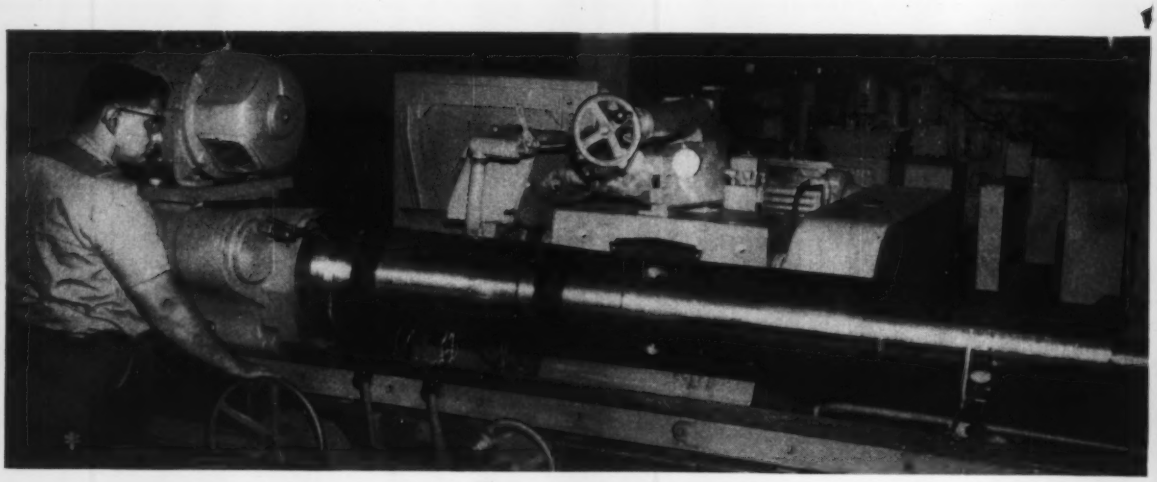
This indicates that your estimates are thoroughly dependable and we look forward to beating them as we become better acquainted with the machine's operation.

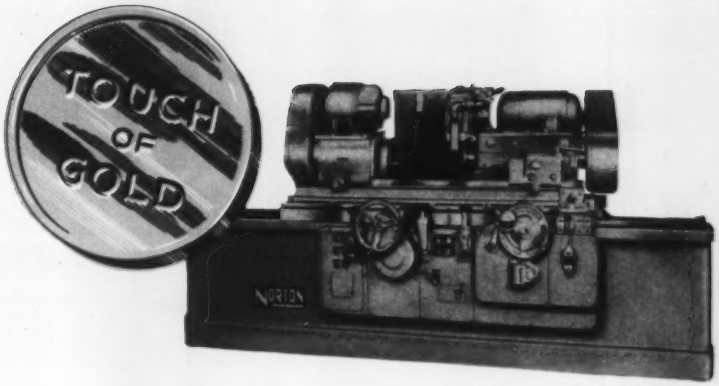
The last time we checked the performance of our Norton 10 x 48" Semi-Automatic Cylindrical Grinding Machine it showed a 46% time saving, compared with your estimate of 39%.

Time estimates like these are a great help. In fact, they are necessary to us, in implementing our equipment replacement policy.

Sincerely,

Ingersoll reports how Norton Cylindrical Grinders save





as predicted

As Mr. Gaylord, the Ingersoll Milling Machine Company's General Manager, points out, Norton machines will give you increased production.

This increased production is just one of the proved "Touch of Gold" advantages of Norton grinding machines. Others are precise sizing control, low maintenance and long, continuous service life. These are designed into each machine.

Norton Cylindrical Grinders have swing capacities ranging from 4″ to 24″ and work lengths from 18″ to 168″. All are available as Plain Machines or Semiautomatics. All have controls for feeds and speeds grouped at the operating position, with key maintenance points located outside. And all are engineered for adaptability to meet changing production requirements, and for durability to keep on delivering economy under the toughest conditions of use.

Call in your Norton Sales Engineer, a well trained, long experienced specialist in grinding. He'll gladly give you an accurate estimate of what Norton grinding machines can do for you. NORTON COMPANY, Machine Division, Worcester 6, Mass. District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit. In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5.

Photos show the types of cylindrical grinders used and described by the Ingersoll Company. Photo at upper right is a Norton 10″ x 48″ Type CTU; photo at left was taken in the Ingersoll plant, and shows their Norton 18″ x 96″ Type LC-2.

NORTON

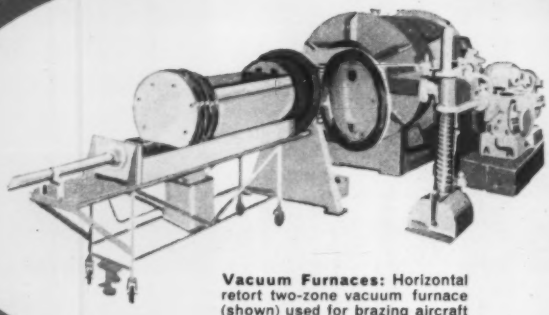
GRINDERS and LAPPERS

Making better products
... to make your products better

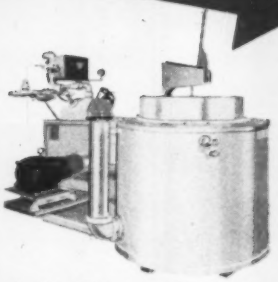
NORTON PRODUCTS Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals — BEHR-MANNING DIVISION Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

Wherever industry needs heat . . .

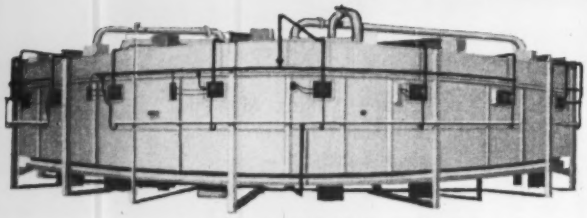
There's *LINDBERG* equipment just right for the specific job



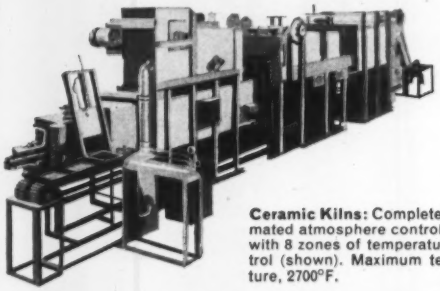
Vacuum Furnaces: Horizontal retort two-zone vacuum furnace (shown) used for brazing aircraft components.



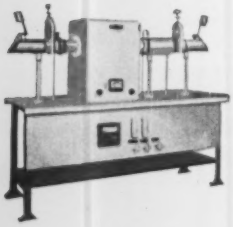
Cyclone Tempering Furnaces: Batch type fuel-fired tempering furnace (shown). Famous in metal treating industry for years.



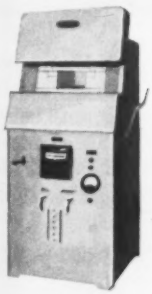
Rotary Hearth Furnaces: Doughnut type field-installed gas-fired furnace (shown) with capacity of 13,000 lbs. per hour.



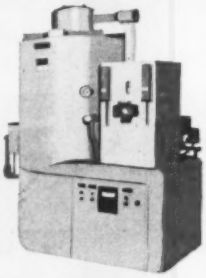
Ceramic Kilns: Completely automated atmosphere controlled kiln with 8 zones of temperature control (shown). Maximum temperature, 2700°F.



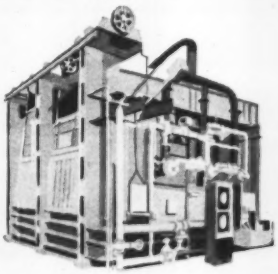
Pilot Plant Equipment: Atmosphere tube unit (shown) for ceramic research and development at temperatures up to 2750° F.



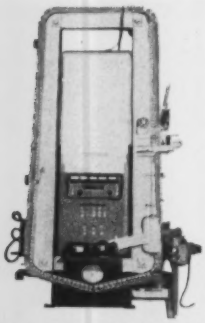
Laboratory Equipment: One-unit box furnace (shown), muffle or for non-oxidizing atmosphere with temperature range to 3000° F.



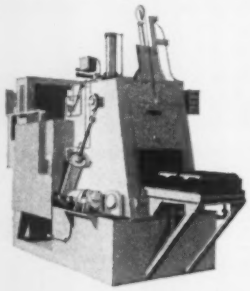
Atmosphere Generators: Hyen generator (shown) for endothermic atmospheres. Generators for all required atmospheres.



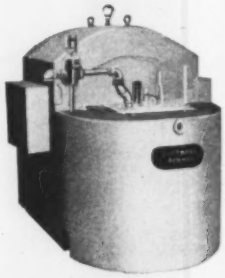
Aluminum Reverberatory Furnaces: Twin-chamber melting and holding furnace (shown) with 45,000 lbs. capacity.



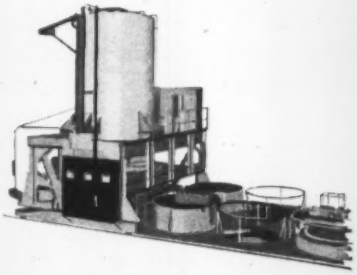
High Frequency Units: Vertically designed, completely automatic "HF" unit (Shown) for aluminizing automotive valves.



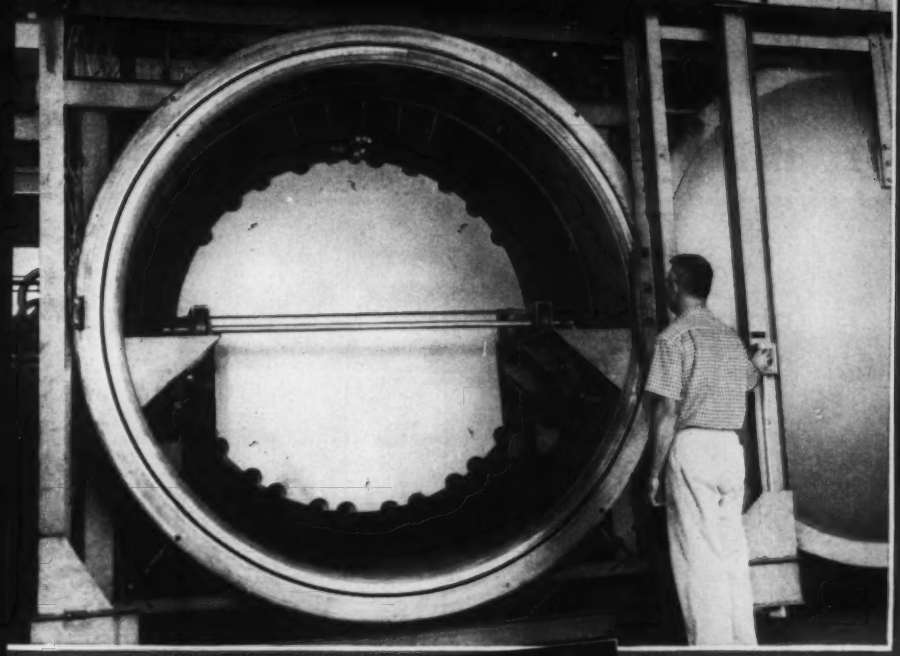
Automatic Carbonitriding Furnaces: Automated integral quench type (shown) with CORRTHERM electric elements.

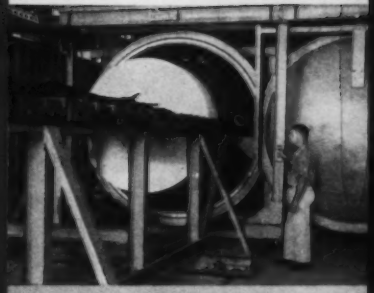


Melting and Holding Furnaces: Electric resistance furnace (shown) with capacities of 750 lbs. to 1500 lbs.

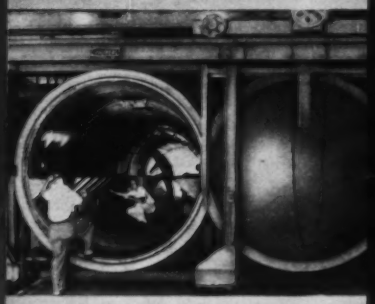


Gantry Type Furnace: Vertical, controlled-atmosphere, drop bottom, hardening furnace. Complete installation field-installed by Lindberg.





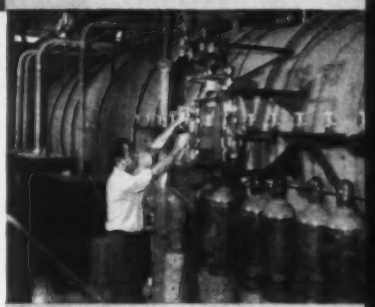
6 feet in diameter, the furnace easily takes large titanium sheets.



Total furnace length is more than 40 feet.

Lindberg-Designed

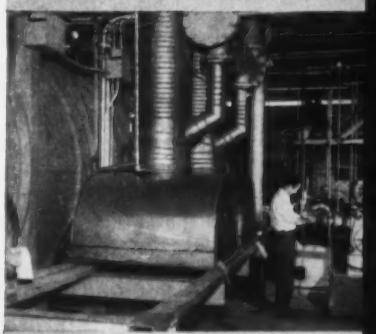
Large Capacity Vacuum Heat Treating Furnace Improves Titanium Quality, Saves Money in Aircraft Manufacture



After vacuum cycle, inert gas is introduced into chamber to assist cooling.

Here is an outstanding example of Lindberg's ability to apply a basic furnace design to the requirements of a specific job. This vacuum furnace was designed for a leading aircraft manufacturer to heat treat large sheets of titanium. In operation it reduces the hydrogen content of the metal from 500 parts per million to 50 parts per million or less, in a maximum time of 6 hours. And this improvement in quality is achieved with a corresponding reduction in production costs. The furnace has a temperature range up to 2100° F. and operates in a vacuum of less than one millionth of an atmosphere. A unique internal cooling system makes the furnace adaptable for brazing stainless steel honeycombs, a new development in aircraft manufacture.

Lindberg equipment and planning can help you find the answer to any problem of applying heat to industry. We cover the field, heat treating, melting and holding, tempering, brazing, enameling furnaces, ceramic kilns, high frequency units, and are in the ideal position to recommend the equipment most suitable for your needs. This can be factory built or field-installed in your own plant, fuel-fired or electric. Consult your local Lindberg Field Representative (see the classified phone book) or get in touch with us direct. Lindberg Engineering Company, 2441 West Hubbard Street, Chicago 12, Illinois. Los Angeles Plant: 11937 South Regentview Avenue, at Downey, California.

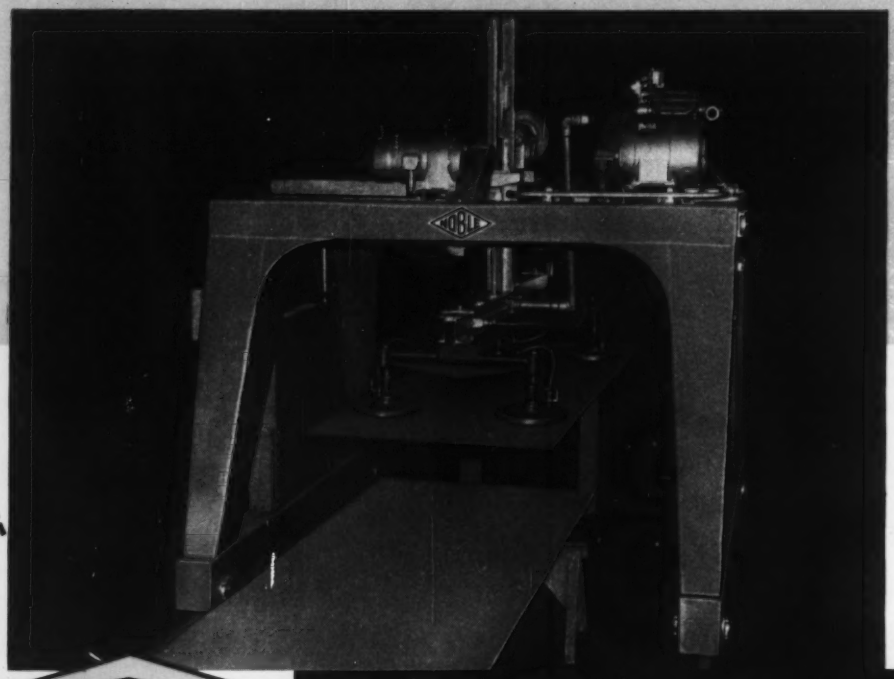


Specially designed pump maintains vacuum of less than one-millionth of an atmosphere.

heat for industry

PROCESSING PLATE?

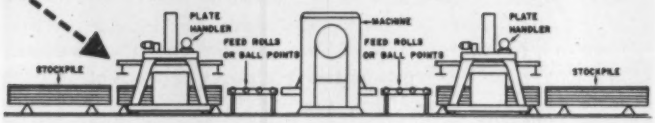
Get the production you're paying for



WITH A

NOBLE *Automatic*

PLATE HANDLING SYSTEM



NOBLE Automatic Plate Handling Systems eliminate the costly, often hazardous manual handling required in processing plate and sheet.

NOBLE handlers automatically pick up from a pile or conveyor, transport and deliver plate or sheet stock to the machine, pick up worked pieces from the machine and deliver them to piles or conveyors. Increase your profits by:

1. **Reduced handling costs** — no handling crews required, no prolonged crane tie-ups.

2. **Better machine utilization** — NOBLE automatics deliver and remove plate as fast as the machine can operate. There's no idle standby while operators wrestle a plate into position.

3. **Increased production** — NOBLE users report gains of 20% or more, depending on conditions, as the result of faster handling and reduced idle machine time.

THREE TYPES AVAILABLE

Standard NOBLE automatic plate handling systems are available in floor-mounted rail, overhead rail and radial transfer types. Standard capacities are 1,000, 2,000, 3,000 and 4,000 lbs. Higher capacities and special designs for specialized applications.

NEW BROCHURE AVAILABLE . . . describes economics of automatic plate handling, proper applications, typical system layouts, and all NOBLE equipment required. Write for your free copy today; please address Dept. S-2.

3

NOBLE COMPANY

1860 Seventh Street • Oakland 20, California

CALENDAR
OF MEETINGS

Feb. 15-19, American Institute of Mining, Metallurgical & Petroleum Engineers Inc.: Annual meeting, St. Francis, Sheraton-Palace, and Sir Francis Drake Hotels, San Francisco. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: E. O. Kirkendall.

Feb. 15-21, Association of Steel Distributors Inc.: Annual convention, British Colonial Hotel, Nassau, Bahama Islands. Association's address: 29 Broadway, New York 6, N. Y. Counsel: Morris Rosoff.

Feb. 16-18, American Management Association: Midwinter personnel conference, Palmer House, Chicago. Association's address: 1515 Broadway, New York 36, N. Y. Personnel division's manager: John D. Staley.

Feb. 17-19, Caster & Floor Truck Manufacturers Association: Winter meeting, St. Moritz Hotel, New York. Association's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: Harry P. Dolan.

Feb. 18-19, Malleable Founders' Society: Technical and operating conference, Wade Park Manor Hotel, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

Feb. 19-20. Eastern States Blast Furnace & Coke Oven Association: Annual winter meeting, Penn-Sheraton Hotel, Pittsburgh. Information: I. N. Kunkle, Donner-Hanna Coke Corp., Box A, South Park Station, Buffalo 20, N. Y.

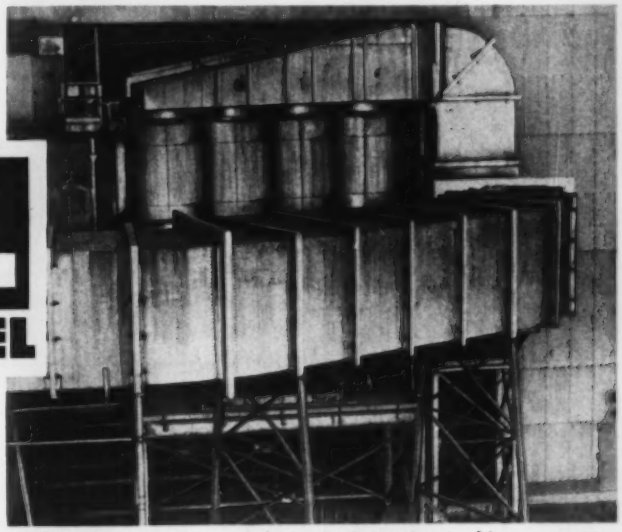
Feb. 23-25. American Management Association: Research and development conference, LaSalle Hotel, Chicago. Association's address: 1515 Broadway, New York 36, N. Y. R&D division's manager: Philip Marvin.

Feb. 25-27, Electronic Industries Association: Annual industrial relations conference, Chase-Park Plaza Hotel, St. Louis. Association's address: 1721 DeSales St. N. W., Washington 6, D. C. Secretary: James D. Secrest.

Feb. 26-27, Alloy Casting Institute: Winter meeting, Boca Raton Hotel, Boca Raton, Fla. Institute's address: 286 Old Country Rd., Mineola, N. Y. Executive vice president: E. A. Schoefer.

Mar. 9-10, International Acetylene Association: Annual meeting, Roosevelt Hotel, New Orleans. Association's address: 30 E. 42nd St., New York 17, N. Y. Secretary: L. G. Matthews.

JL STEEL



Buell Cyclone System on gas duct exit of sintering machine at Jones & Laughlin, Cleveland.

BUELL High Efficiency Cyclones at Jones & Laughlin

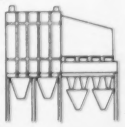
Specially designed for sintering machine operation, these Buell extra-efficient cyclone collectors handle 280,000 CFM of dust-laden gases from sinter bed before entering exhaust fan. Sixteen large-diameter cyclones at exhaust fan and four at the discharge end recover an important *extra percentage* of dust, beyond the abilities of ordinary cyclones, that contributes to the operating efficiency of the machine.

Only Buell Cyclones have the "Shave-off", which traps dust rising in the double eddy currents within the cyclone. This uniquely successful feature increases cyclone efficiency, permits large-diameter design which eliminates bridging, clogging, or plugging. Heavy plate construction and ¾" refractory lining provide long service life and minimum maintenance.

Decades of experience in the collection and recovery of industrial dusts back up Buell engineers. An analysis of your plant's dust collection problems may be made without cost or obligation. For a copy of the booklet, "The Exclusive Buell Cyclone", just write Dept. 26-B, Buell Engineering Company, Inc., 123 William Street, New York 38, N. Y.

BUELL CYCLONES

"SF" ELECTRIC PRECIPITATORS



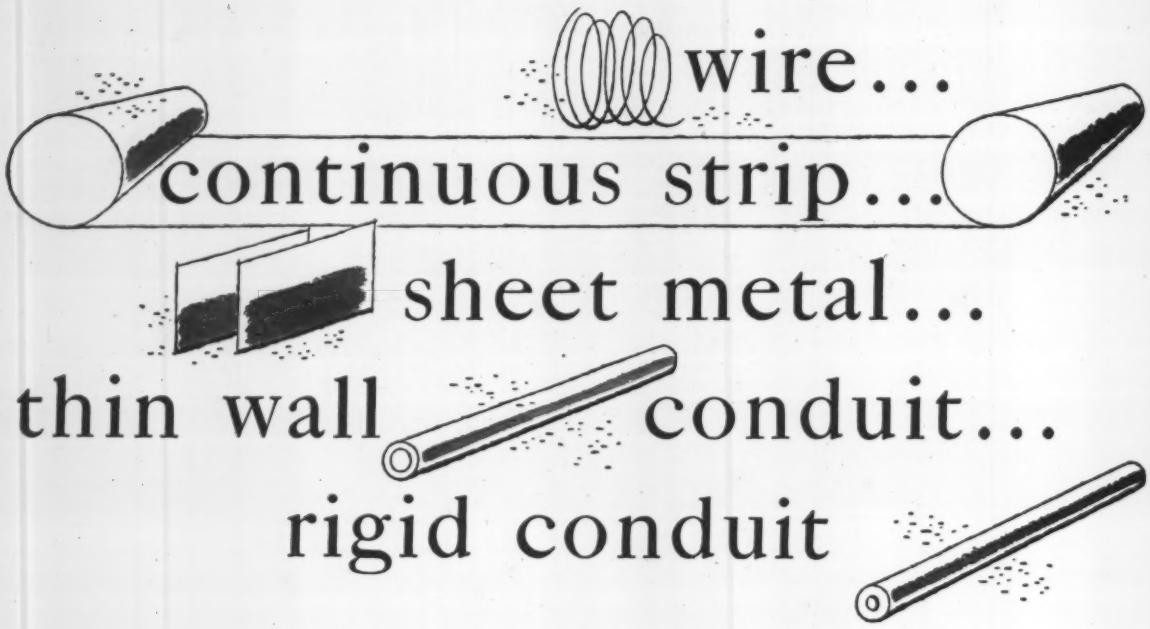
PRECIPITATOR-CYCLONE COMBINATIONS

buell®

Experts at delivering Extra Efficiency in

DUST COLLECTION SYSTEMS

IF YOU PROCESS...



YOU CAN *Automate* ALL THESE OPERATIONS:

- cleaning
- pickling
- plating
- phosphating
- scrubbing
- paint prep
- electrogalvanizing

For Faster, Better Production . . . At Far Less Cost
with an
H-VW-M CONTINUOUS LINE SYSTEM

WRITE today, at no obligation, for the facts about an H-VW-M System that can bring cost-saving *automation* to your continuous line finishing—a system that can be integrated with your shearing, forming, slitting or annealing operations.

Hanson-Van Winkle-Munning Company, Matawan, New Jersey. Offices in principal cities

H-VW-M

Industry's Workshop for the Finest in Plating, Anodizing, and Polishing Processes • Equipment • Supplies

PLATEMANSHIP —Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

From Vacuum-Poured Ingot to Generator Shaft

This complex generator shaft began as a huge ingot of nickel-molybdenum-vanadium steel, cast by the vacuum method developed at Bethlehem. Our facilities now produce the largest ingots ever made by the vacuum-casting process.

Through successive steps of forging, treating, and machining, the ingot gradually became the glistening shaft you see above. As shown here in a Bethlehem machine shop, the 62-ton forging is about 30 ft long.

BETHLEHEM STEEL

BETHLEHEM STEEL

Hardened Rolls Must Have Perfect Finish

Pampered and groomed like a fine thoroughbred, the forged hardened roll is one of the stars of Bethlehem's specialty shops. This 13-ton beauty will be used in the rolling of aluminum foil. The machinist's intense concentration is nothing unusual; Bethlehem rolls are ground and polished with extraordinary care. The goal *has* to be perfection when rolls are made for the processing of sheets, strip, or foil.

Getting a Heavyweight in Shape

Here's how a massive forging looks as it's pounded and squeezed into shape by a 7500-ton press. Glowing hot, the steel is skillfully worked under tremendous pressures, until its ultimate form can be clearly recognized. Machining then removes surplus metal and transforms the rough giant into a finished product. This Bethlehem-made forging, weighing 123 tons before machining, is a turbine shaft for the Rocky Reach Hydroelectric Power Project, Chelan County, Wash.

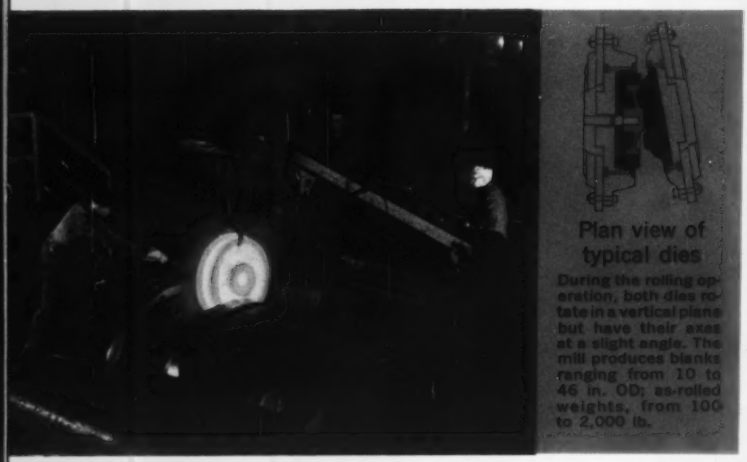
BETHLEHEM STEEL

BETHLEHEM STEEL

Through the Years - Millions of Drop Forgings

Year in, year out, drop and mechanical-press forgings stream from the Bethlehem shops in endless variety. This one, 31 lb as-forged, is part of a clutch housing.

Bethlehem shops are equipped with steam and board drop hammers to 8,000 lb; mechanical presses to 3,000 tons; upsetters to 9 in.



Plan view of typical dies

During the rolling operation, both dies rotate in a vertical plane but have their axes at a slight angle. The mill produces blanks ranging from 10 to 46 in. OD; as-rolled weights, from 100 to 2,000 lb.

Unique Mill Forges and Rolls in a Single Operation

This is Bethlehem's famed circular-products mill, the only one of its kind in the country. In less than one minute, this ingenious device will forge and roll a gear blank, sheave or crane wheel, flywheel, turbine wheel, pipe flange, coupling, or other circular steel shape. The process insures excellent grain flow and machinability, and very high strength in the finished product. Virtually any grade of steel can be handled—carbon, alloy, stainless, heat-resistant.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Folder 674 592 Printed in U.S.A.

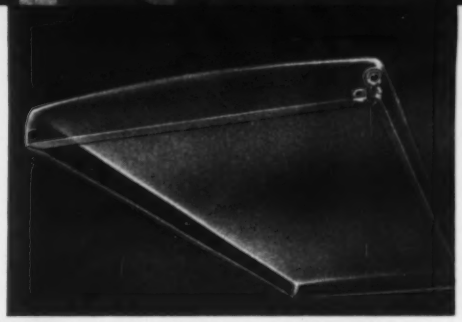
Any size refrigerator doors— the easy way

Another Federal Packaged Production Line goes into action

This latest Federal/Warco Packaged Production Line automatically anneals, embosses, pierces and welds refrigerator door panels of varying sizes, either right- or left-hand, with no change in tooling at a rate of 225 doors per hour.

What's more, this line is unitized . . . stations are put together in sections so the line can be altered to meet design changes in later models. All added parts, such as thimbles and nuts, are fed from hoppers, automatically positioned and welded into place.

If you are making metal products that require several operations, why not ask a Federal/Warco engineer in to show you how a Packaged Production Line can put you in a better competitive position.



Close-up of refrigerator door panel shows operations performed on the line. Right corner is gas annealed and embossed. Three holes are pierced in the piece, and hinge pin retainer and nut stop are automatically welded into exact position.

Federal / Warco
PACKAGED
PRODUCTION LINES

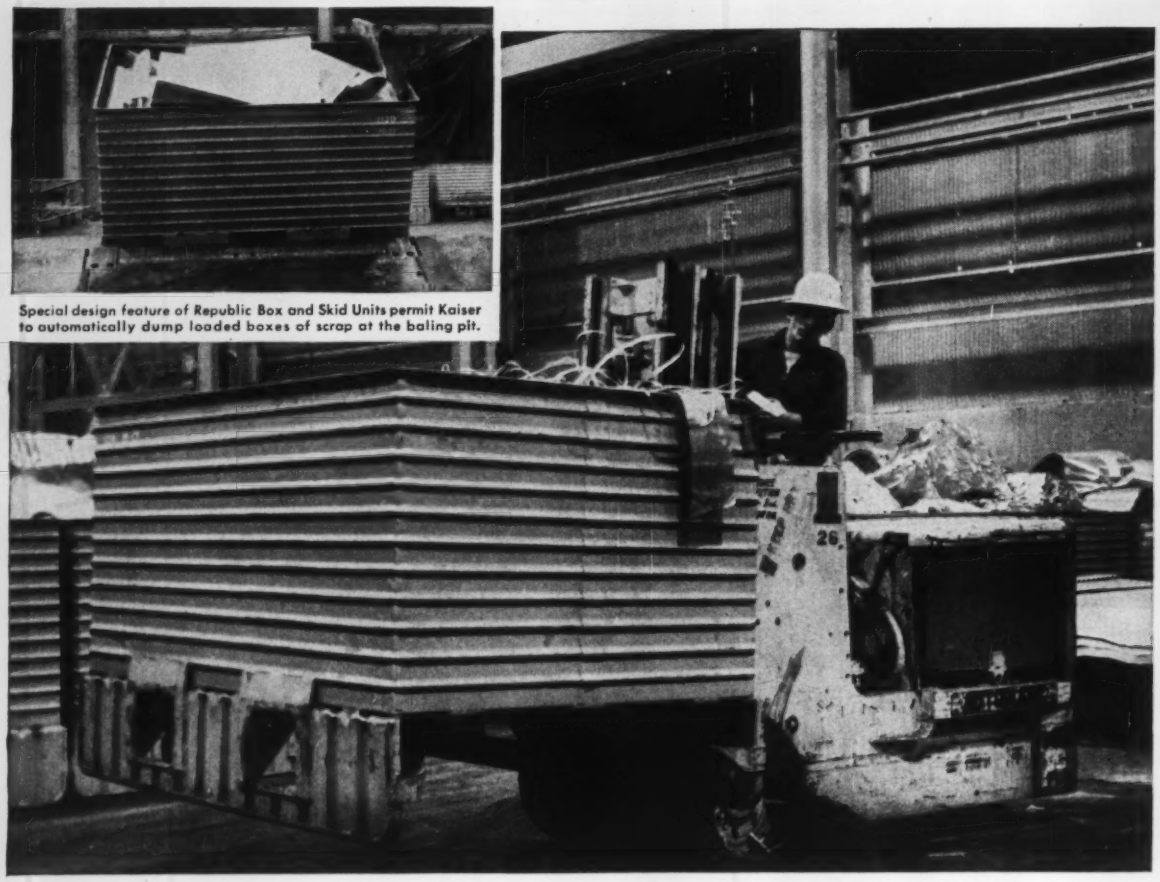
THE FEDERAL MACHINE AND WELDER COMPANY - WARREN, OHIO

AFFILIATED WITH BERKELEY-DAVIS, INC., DANVILLE, ILLINOIS, MANUFACTURERS OF AUTOMATIC ARC WELDING EQUIPMENT.

New Materials Handling Ideas from Republic

STEEL BOXES SERVE AS PORTABLE WAREHOUSES, PROVIDE SPEED, ACCURACY IN HANDLING SCRAP

Special design feature of Republic Box and Skid Units permit Kaiser to automatically dump loaded boxes of scrap at the baling pit.



THESE REPUBLIC STEEL BOX AND SKID UNITS ARE PERFORMING DOUBLE DUTY at Kaiser Aluminum & Chemical Corporation's new Ravenswood, West Virginia Works. The units play an important role in helping Kaiser maintain its scrap identification and separation system.

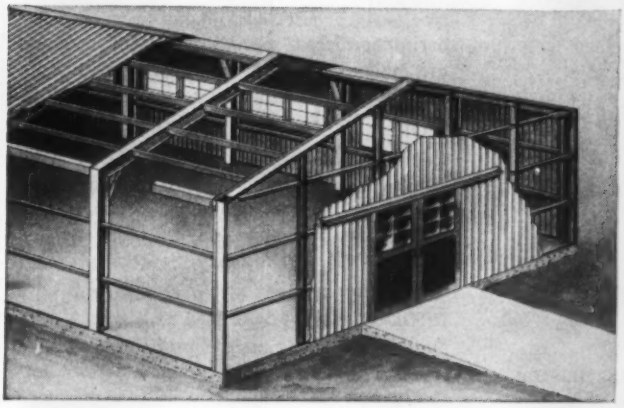
The boxes are used first in finishing areas where scrap is generated. When filled, each box is tagged to indicate the type of alloy it contains. Then it is picked up and moved by fork lift truck to a storage area where it serves as a portable warehouse. The boxes remain in storage until the scrap is scheduled for baling and remelt.

The boxes, designed and built by materials handling specialists at Republic's Berger Division, measure 6′ 5″ long, 4′ 6″ wide, and 4′ 1½″ high. They are built for 8000 lb. load capacity. The skid sections are designed for four-way entry by fork truck to provide easy handling in restricted space. This design feature also permits the boxes to be dumped automatically by a tipping device at the baling pit.

In addition to fast, accurate scrap handling, Kaiser should also benefit from future savings in maintenance costs. Corrugated construction of the box and skid units adds strength and rigidity, assures long service life at the lowest per-year cost.

Talk over your handling or storage problems with a Republic Specialist. He will help you select or design a standard or special unit that could save time, cut costs, simplify an operation. There is no obligation. Contact your Republic Materials Handling Representative. Or mail the coupon.

SPACE-SAVING HIGH STACKING WITH THE WORLD'S STRONGEST SHELVING. It's Wedge-Lock Steel Shelving manufactured by Republic's Berger Division. The secret of high stacking is in Wedge-Lock's exclusive sway-proof joint that actually becomes tighter as the load increases. Wedge-Lock includes the three essentials of good steel shelving: a post that will not buckle, a reinforced shelf that does not sag, a concealed sway-proof joint. Berger storage engineers will help you design an installation to fit your needs. Mail coupon for details.



SIMPLIFY PALLETIZING AND STACKING, SAVE SPACE with Republic Steel Pallet Racks. The savings of palletized handling now can be applied to bulky, uneven, odd-lot, and fragile materials. Republic Steel Pallet Racks make palletizing practical. Tubular steel supports adjust every six inches to handle palletized material of any height. Select single pallets from any level without restacking. Two-way entry permits loading and unloading from either side. Send coupon for complete specifications.

TRUSCON'S NEW COMPLETE STEEL BUILDINGS are low in cost, quickly erected, reusable. These new "Budget Buildings" by Republic's Truscon Division bring the cost of additional storage space down low. Simplified design permits fast on-site erection. No painting needed. Siding, roofing, doors, windows, hardware all included. Immediate delivery in widths 32, 36, 40, 44, and 48 feet . . . 12- and 14-foot heights. Lengths as long as you want them. Send coupon for bulletin covering complete facts.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. ST-6177-R
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

☐ Have a Materials Handling Engineer call.

Send more information on:
☐ Materials Handling Equipment ☐ Steel Pallet Racks
☐ Wedge-Lock Steel Shelving ☐ Truscon "Budget Buildings"

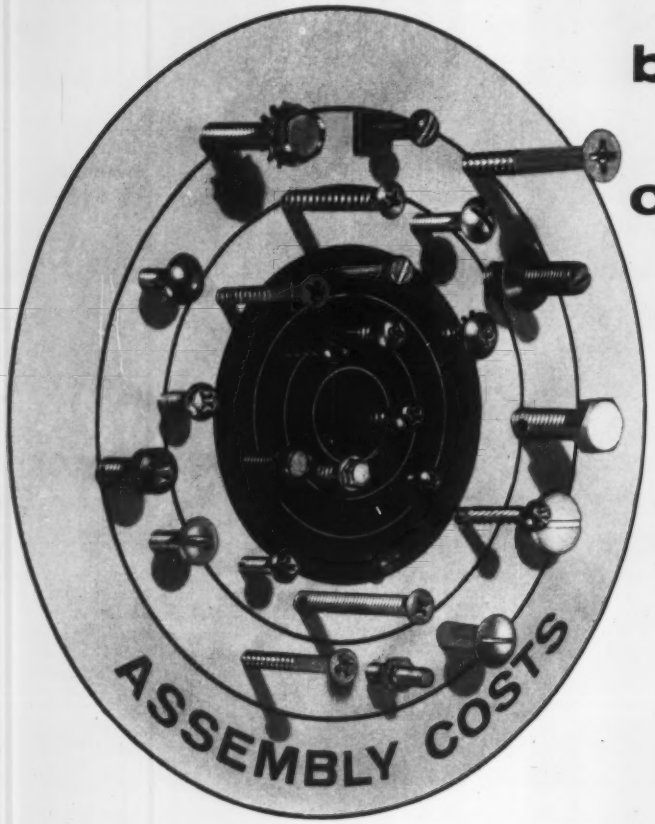
Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Continental can help you score more hits on your biggest target for cost reduction



Assembly accounts for up to 80% of the total cost of production. For most manufacturers, it is the biggest target for cost reduction.

If you are missing out on savings you could be making, why not get the expert assistance of Continental Assembly Specialists?

You'll find them ready and able to analyze your fastening operations and offer practical cost-saving ideas. They'll show you why assembly-men everywhere agree, ***"You can count on Continental."*** Write or phone: Continental Screw Co., 462 Mt. Pleasant St., New Bedford, Mass.

NO "FAVORITE" FASTENERS
Continental Assembly Specialists are unbiased toward any particular types . . . Continental makes all types. The fastener they recommend for your job is the one proved best by careful cost analysis.

MORE STANDARDS IN STOCK
Continental can supply any recognized standard type, style or size. Also, many fasteners ordinarily considered "specials" are available among the millions of screws constantly in stock to meet needs of Continental customers.

MORE "SPECIAL" EXPERIENCE
Continental is known throughout industry as the "specialist in specials," — leads in production of special designs. Continental is also your supply source for special-purpose fasteners, such as HOLTITE NYLOK Self-locking Screws.

MORE "SPECIAL" PRODUCTION FACILITIES
With Continental's modern, precision controlled equipment, many special shaped screws formerly machined from bar stock can be produced faster, at lower cost — with higher tensile strength and excellent surface quality.

MEMBER SCREW RESEARCH ASSOCIATION

CONTINENTAL
SCREW COMPANY, NEW BEDFORD, MASS.
HOLTITE FASTENERS

HOLTITE PHILLIPS AND SLOTTED HEAD
WOOD • MACHINE • TAPPING
THREAD FORMING •
SEMS • NYLOK
HY-PRO PHILLIPS INSERT BITS AND HOLDERS

HY-PRO TOOL COMPANY . . . DIVISION
RESEARCH ENG. & MFG., INC. SUBSIDIARY

Charging-Box Cars . . .
built to last by a company that uses them!

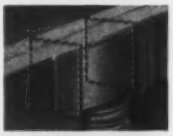
5 unique structural features make them better

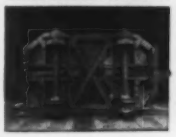
Charging-box cars have to take a lot of punishment. And, in the 36 years we have been making charging-box cars for our own use, United States Steel has developed several features in structural design that assure longer life, less maintenance, and dependable service.

As illustrated in the typical four-box car shown here, the advantages of these design features—plus the rugged durability of all-welded *rolled* steel construction—make any size USS Charging-Box Car a profitable investment.

Our representatives will be pleased to call at your convenience to discuss your requirements for this or any other type of industrial car. Meanwhile, write for our free illustrated booklet—*USS Custom Designed Cars.* United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark





Box girder construction: Two channel sections, welded toe-to-toe, provide a frame far stronger than the ordinary angle or channel frame. This box frame is used under both the sides and ends of the car.

Double center sills: *Two* channels, back to back, run the entire length of the car. All cross members are welded to these sills, providing superior longitudinal rigidity.

X-frame bracing: These cross braces tie the box girder frame and the center sills together for additional strength and rigidity.

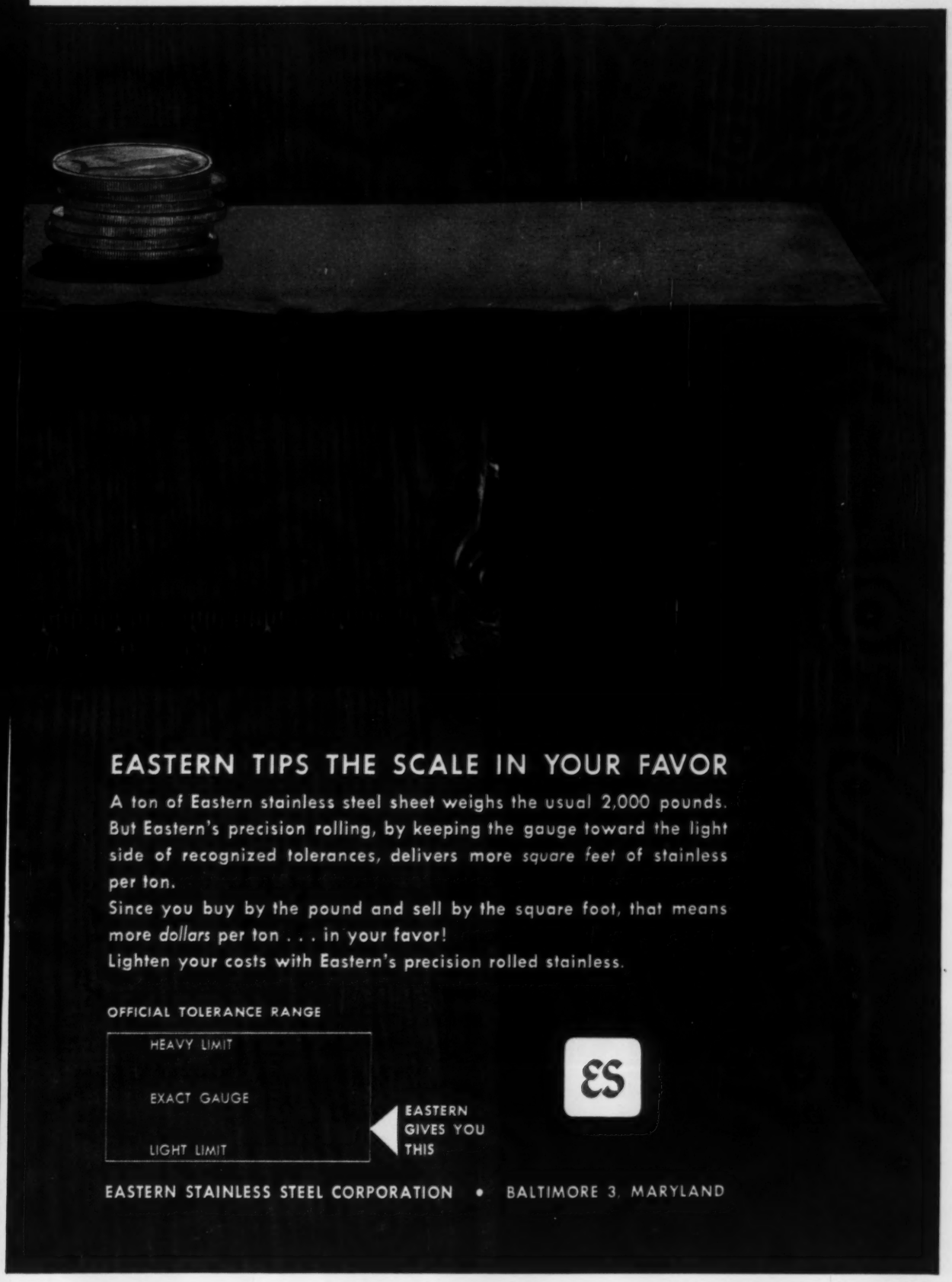
Spring pockets: Over each wheel, pockets are built into the bottom of the frame and "boxed in" on all sides. Coil springs are set into these pockets. This construction permits vertical, but no lateral, movement of the springs.

Long-shanked couplers: Pivot points of couplers are *behind* each axle. This permits turning the car on a short radius curve with less wheel flange pressure than with a short-shanked coupler.

USS

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

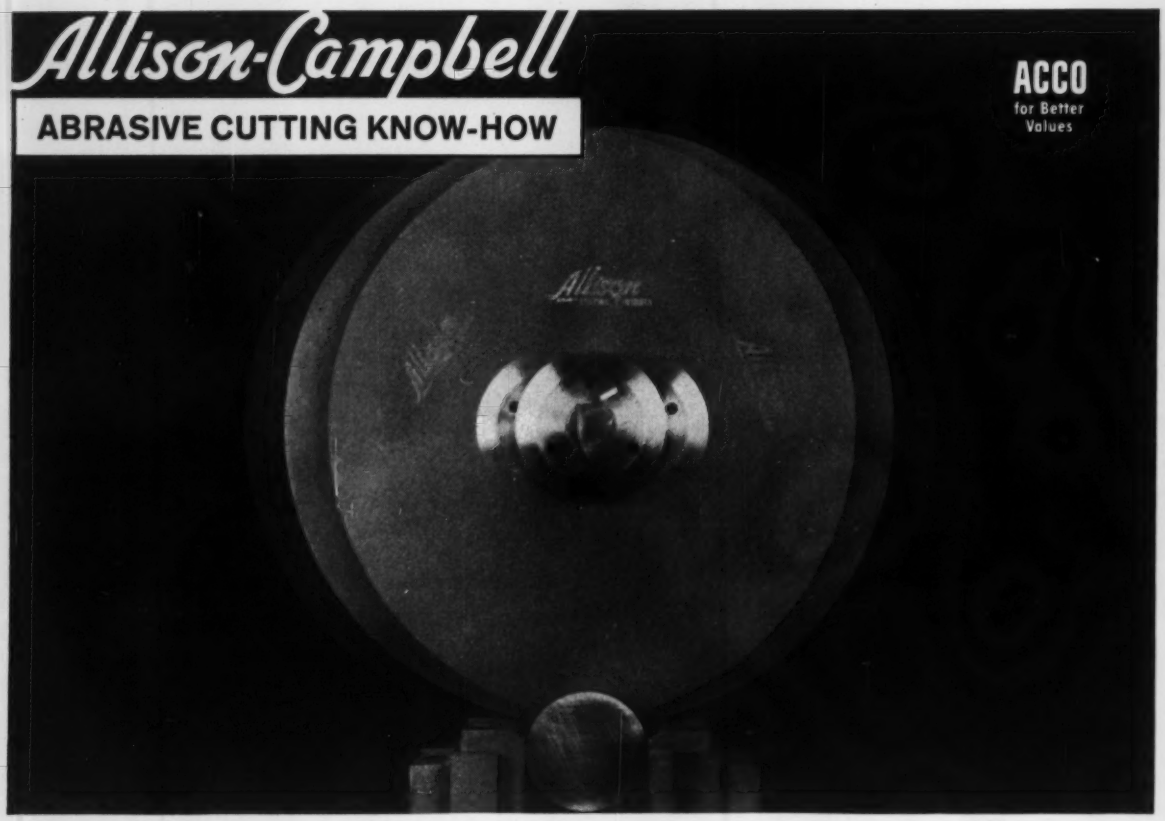
United States Steel


EASTERN TIPS THE SCALE IN YOUR FAVOR
A ton of Eastern stainless steel sheet weighs the usual 2,000 pounds. But Eastern's precision rolling, by keeping the gauge toward the light side of recognized tolerances, delivers more *square feet* of stainless per ton.
Since you buy by the pound and sell by the square foot, that means more *dollars* per ton . . . in your favor!
Lighten your costs with Eastern's precision rolled stainless.
OFFICIAL TOLERANCE RANGE
HEAVY LIMIT
EXACT GAUGE
LIGHT LIMIT
EASTERN GIVES YOU THIS
ES
EASTERN STAINLESS STEEL CORPORATION • BALTIMORE 3, MARYLAND

Allison-Campbell

ABRASIVE CUTTING KNOW-HOW

ACCO
for Better
Values



Oscillation Improves Abrasive Cutting 4 Ways

On an oscillating-type abrasive cut-off machine, the cutting wheel is rocked back and forth *across* the cut while the wheel is fed downward. This horizontal movement produces some remarkable results.

1 **Greater cutting capacity** is one big advantage of oscillation. Because oscillation reduces the arc of contact between the wheel and the work, it is possible to cut solid steel bars up to 12″ square. Without oscillation, 2″ to 3″ would be the practicable limit.

2 **Faster cutting** is another benefit of oscillation. Because the reduced arc of contact offers less resistance to the cutting wheel on large sections, the same wheel cuts faster, straighter, and with less feed pressure. Cutting rates of 4 to 8 seconds per square inch are maintained on even the largest cross-sections.

3 **Better quality cuts** are obtained with oscillation. Less heat is generated because of the small arc of contact, and the rocking action permits coolant to enter the cut more easily and prevent any heat build-up.

Burn-free cuts are produced with negligible burr, and there is little or no need for further finishing.

4 **Longer wheel life** is an important economy factor. The lower cutting temperature resulting from oscillation adds extra cuts to the life of every wheel.

The better flow of coolant within the cut washes away metal chips and loose abrasive, helping wheel efficiency.

HOW ALLISON-CAMPBELL CAN HELP

A complete selection of machines and wheels for *any* cut-off application is offered by ALLISON-CAMPBELL. Four types of CAMPBELL machines—chop stroke, oscillating, horizontal, and rotary—in capacities from the smallest stock to 14″ rounds . . . billets up to 12″ square . . . plate up to 6″ thick and 20 ft. long. ALLISON wheels—more than 150 different specifications—rubber or resinoid bond—3″ to 34″ diameters—.006″ to 3/16″ thick.

Expert recommendations from your ALLISON-CAMPBELL Field Engineer can solve your cut-off problems for you. He'll be glad to show you how to get the faster, cleaner cuts you can expect from modern abrasive cutting techniques. Ask him.

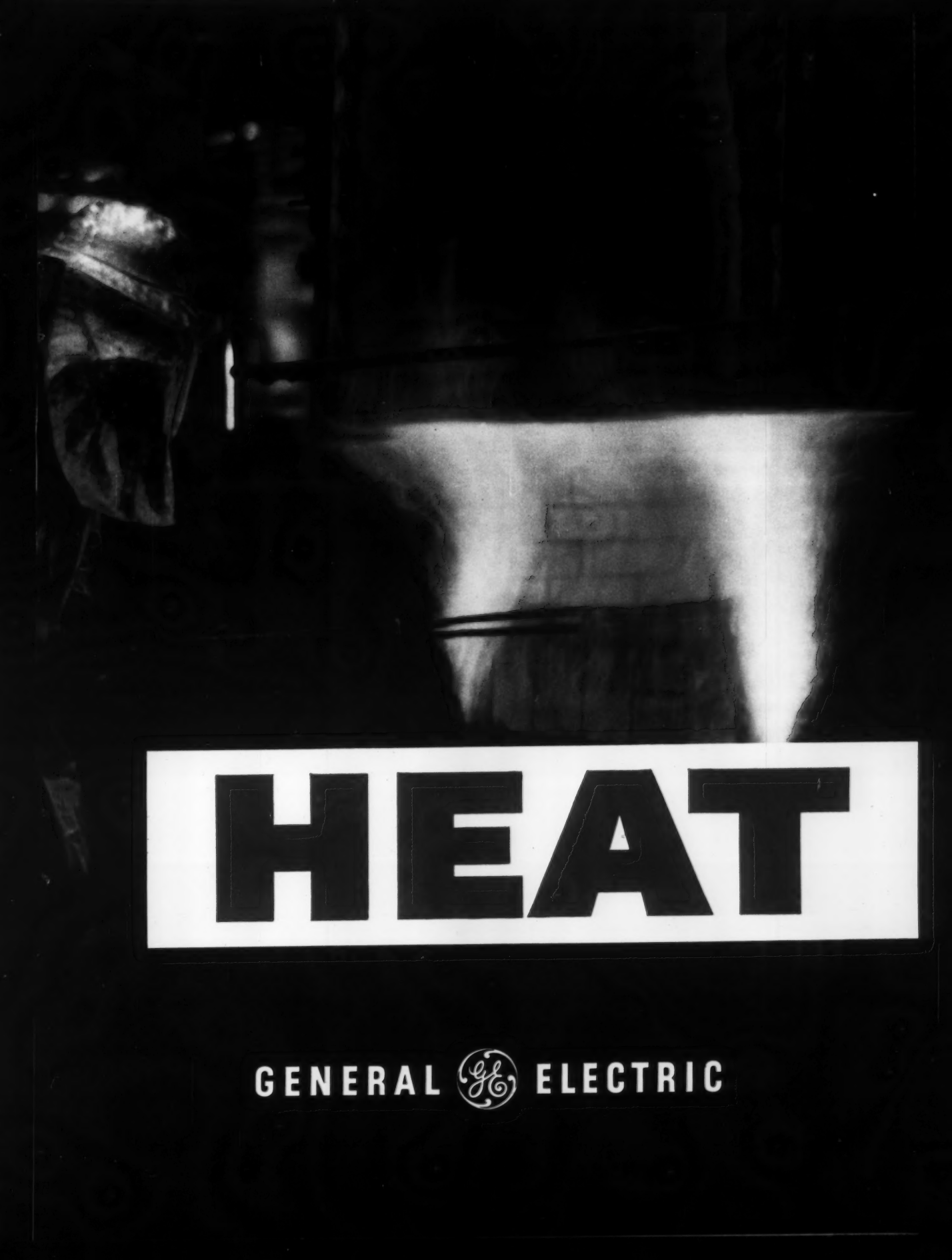
WRITE FOR NEW BULLETIN

• Individual analysis of your cutting problems can be made in the new ALLISON-CAMPBELL Demonstration Laboratory. Write for a copy of DH-20, a new bulletin which describes how you can use these facilities. Complete details on ALLISON wheels and CAMPBELL machines are also available.

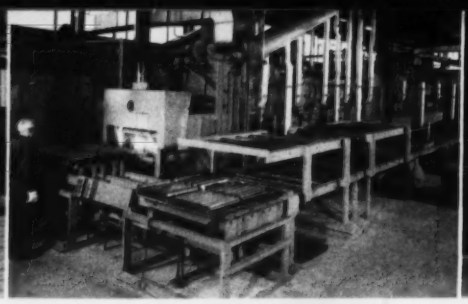
ALLISON-CAMPBELL DIVISION
AMERICAN CHAIN & CABLE

921 Connecticut Avenue, Bridgeport 2, Conn.

ACCO
TRADE MARK


HEAT
GENERAL ELECTRIC

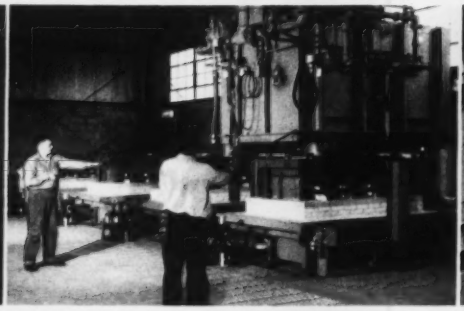
Conveyor Hardening Furnace



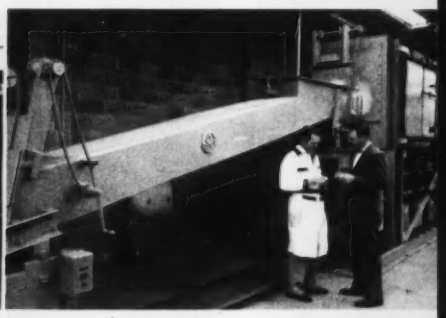
Gas-fired Roller Hearth Furnace

Car Bottom Furnace

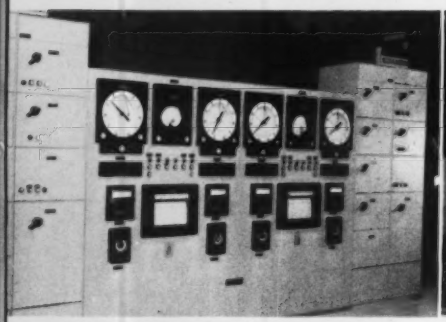
Vacuum Arc Melting Furnace



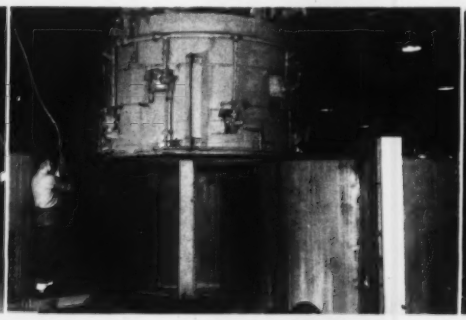
Gas-fired Vacuum Bell Furnace



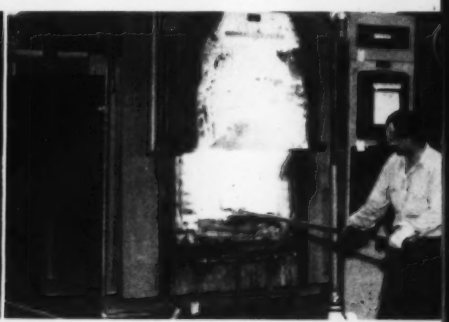
Mesh-belt Furnace



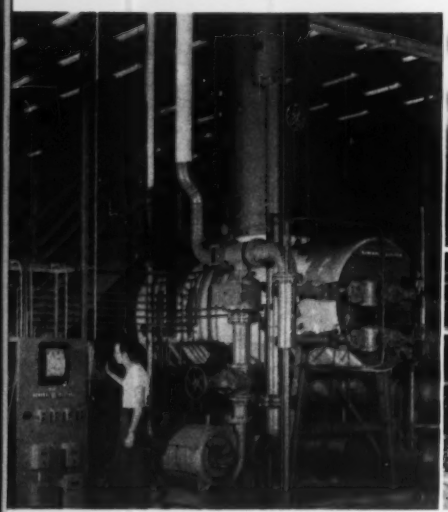
Heat Processing Control



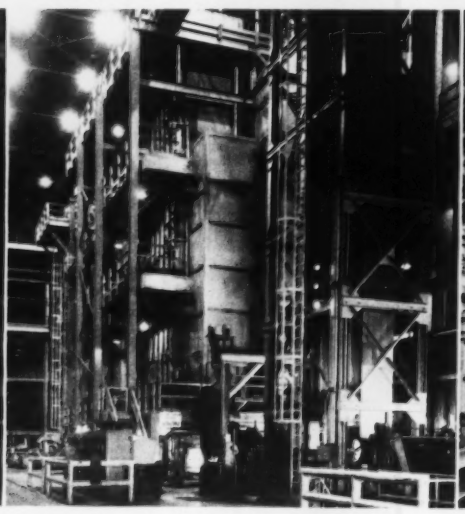
Gas-fired Cylindrical-bell Furnace



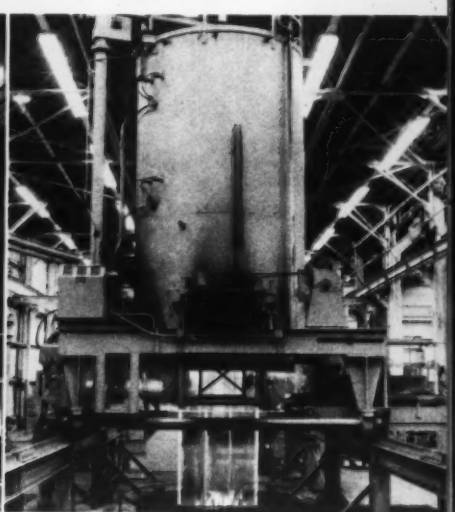
Electric Box Furnace



Gas Atmosphere Producer

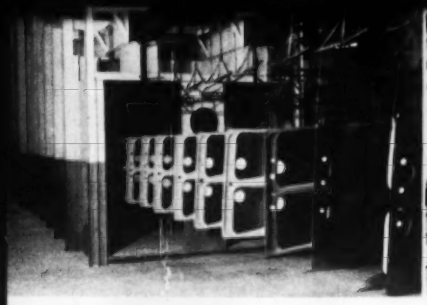


Vertical Strip Annealing Furnace

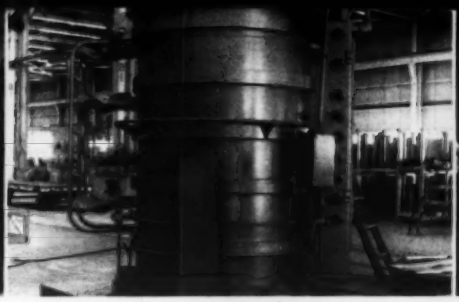


Traveling Cylindrical Furnace

GAS OR ELECTRIC HEAT FOR MANY



Overhead-conveyor Furnace



Double-pump Vacuum Furnace

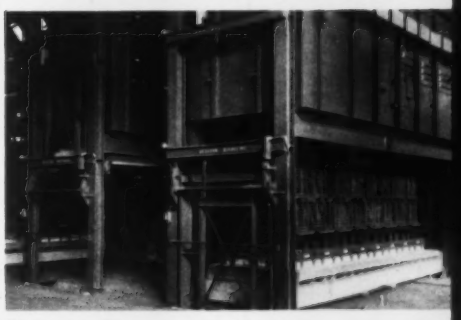
Rotary Hearth Furnace

SELECT YOUR APPLICATION...OR YOUR PROCESS

You'll find General Electric equipment designed for the job

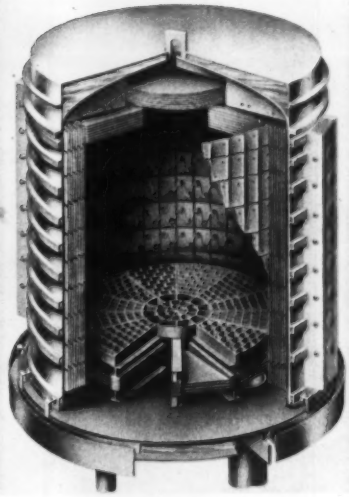
General Electric Heating Equipment for Your Process	Box with Cooling Chamber	High Temperature Box	Box with Retort	Mesh-Belt	Hump Mesh-Belt	Roller Hearth	Elevator	Low-temperature Bell	High-temperature Bell	Pit	Tower	Horiz. Skip	Rotary Hearth	Conveyor Hardening	Pusher	Car Bottom	Overhead Conveyor	Traveling Bell	Vacuum Bell	Wire Enameling	Purified Exothermic	Ammonia Dissociator	Endothermic	Exothermic	Vacuum Arc	Heaters & Devices
Aging							X	X		X																
Annealing	X	X	X	X	X	X	X	X	X	X	X	X			X	X		X	X		X	X	X	X		
Brazing	X		X	X	X	X	X		X						X	X		X			X	X	X	X		
Drawing	X			X		X		X		X			X		X	X		X			X			X		
Vitreous Enameling		X		X													X									
Continuous Wire Processing																				X	X	X	X	X		
Forging		X											X		X											
Malleabilizing							X	X	X	X					X						X					
Nitriding			X					X																		
Normalizing	X	X				X	X			X		X		X	X	X		X			X		X	X		
Hardening	X	X			X	X				X		X	X		X			X			X	X	X	X		
Sintering	X		X	X	X	X			X							X			X		X	X	X			
Stress Relieving	X		X	X	X	X	X	X				X			X	X		X			X			X		
Melting																									X	X

GENERAL ELECTRIC

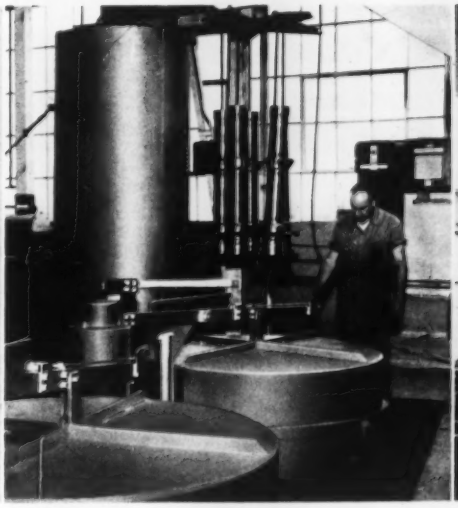


Elevator Furnace

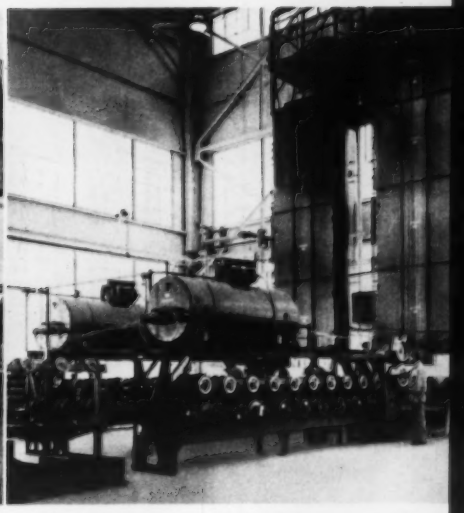
Pusher-type Furnace



Radiation Shield Furnace



Cylindrical Pit Furnace



Wire Processing Equipment

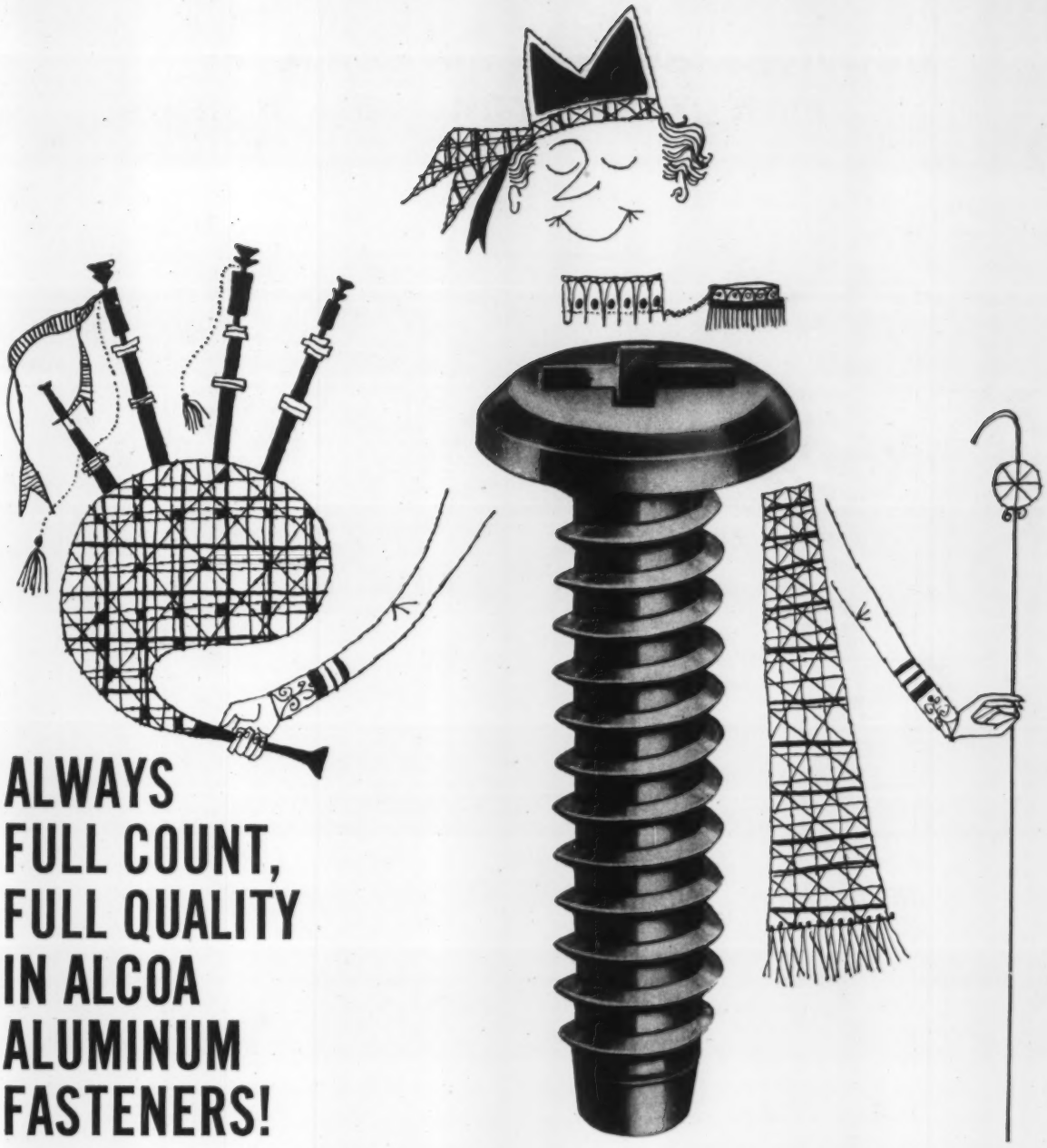
APPLICATIONS....

HEAT from General Electric can improve unit quality, cut unit cost

Modern heat processing equipment can pay for itself by reducing the losses incurred with an out-of-date furnace. For instance, nearly any product, like those shown below, can be made better and at less cost through a heat processing modernization plan set up by General Electric. This plan can help you speed production, cut rejects, and reduce maintenance costs in hundreds of processing jobs. The savings can pay the initial cost of a new system in two to three years—you get extra profits in years to come, cost savings and a more saleable product today.

Call a G-E Heating Specialist now. He will be pleased to figure your present costs and your potential savings. Contact your nearest General Electric Apparatus Sales Office or write Section 721-18, General Electric Company, Schenectady 5, New York.

GENERAL ELECTRIC



ALWAYS FULL COUNT, FULL QUALITY IN ALCOA ALUMINUM FASTENERS!

YOU'LL FIND 144 or more *perfect* fasteners in *every* gross box when you order from your local Alcoa Distributor. On bulk items, too, you'll receive the number of pieces ordered. And there'll be no rejects, no misfits, no "seconds" . . . whether you buy a hatful or a carload!

And, of course, Alcoa® Aluminum Fasteners give you maximum protection against corrosion. Their bright, flawless finish adds extra sales appeal to your product at the time of purchase—and won't stain or mar it at any time *after* purchase.

Your Alcoa Distributor carries *complete* stocks of all standard types and sizes, locally—for really prompt filling of your orders. You'll find him in the Yellow Pages of your phone book. Why not give him a call right now? Or, if you'd like additional facts and a few samples, just mail the coupon!

Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM

For Exciting Drama Watch **"Alcoa Theatre,"** Alternate Mondays, **NBC-TV** and **"Alcoa Presents,"** Every Tuesday, **ABC-TV**

FREE . . . FACTS, SAMPLES FREE . . . FACTS

Aluminum Company of America
2005-B Alcoa Bldg., Pittsburgh 19, Pa.

Gentlemen: Please send complete specification data and samples of Alcoa Aluminum Fasteners.

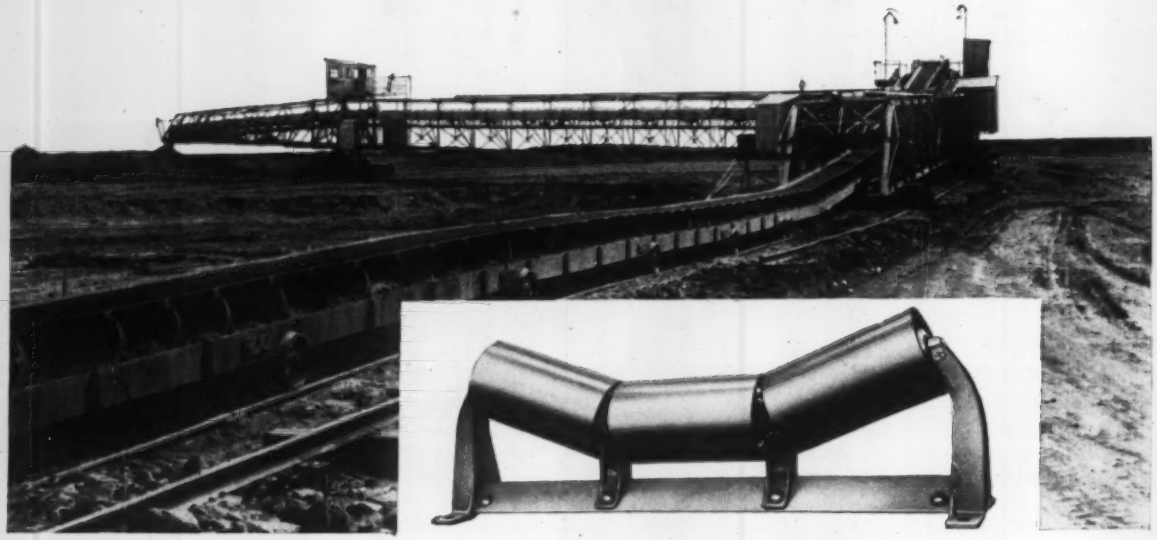
Name_____

Title_____

Company_____

Address_____

New-type idlers on old conveyor stretch greasing intervals to years



Three-mile conveyor has 48" belt, carrying capacity of 1800 yards per hour at 675 feet per minute.

Jeffrey **PERMASEAL®** Idler

30 million yards of overburden since 1948
10 million more on this job...
M. A. Hanna, Pierce Mine, North Hibbing, Minnesota

Removal of 2,700,000 yards to date has required a mile of new conveyor sections, extending the entire system over three miles of hilly Minnesota terrain.

Jeffrey PERMASEAL® Idlers are installed as original equipment in the new sections, as replacement idlers in the old sections.

PERMASEAL'S unique double seal design protects bearings as they have never been protected before, stretches greasing intervals from months to years – slashes direct and indirect costs. At M. A. Hanna and many other companies, PERMASEAL® Idlers are proving their ability to outlast any other idler on the market.

Your materials-handling supervisor should have our new Catalog No. 909 on belt conveyors. It has valuable design and descriptive data. Contact a Jeffrey distributor, or write The Jeffrey Manufacturing Company, 889 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

1000 strokes a minute!

Now in daily operation at the Truarc Retaining Rings Division of Waldes-Kohinoor, Inc., of Long Island City, New York, this new Bliss High Production Press is running at the blurring speed of 1000 strokes a minute, hour after hour, day after day. First of its kind, this completely new press has a revolutionary counterbalancing system and massive, close tolerance construction that virtually eliminate vibration, even at this phenomenal speed. Could a press like this cut your parts cost...add to your profit picture? We'll be glad to give you the facts.

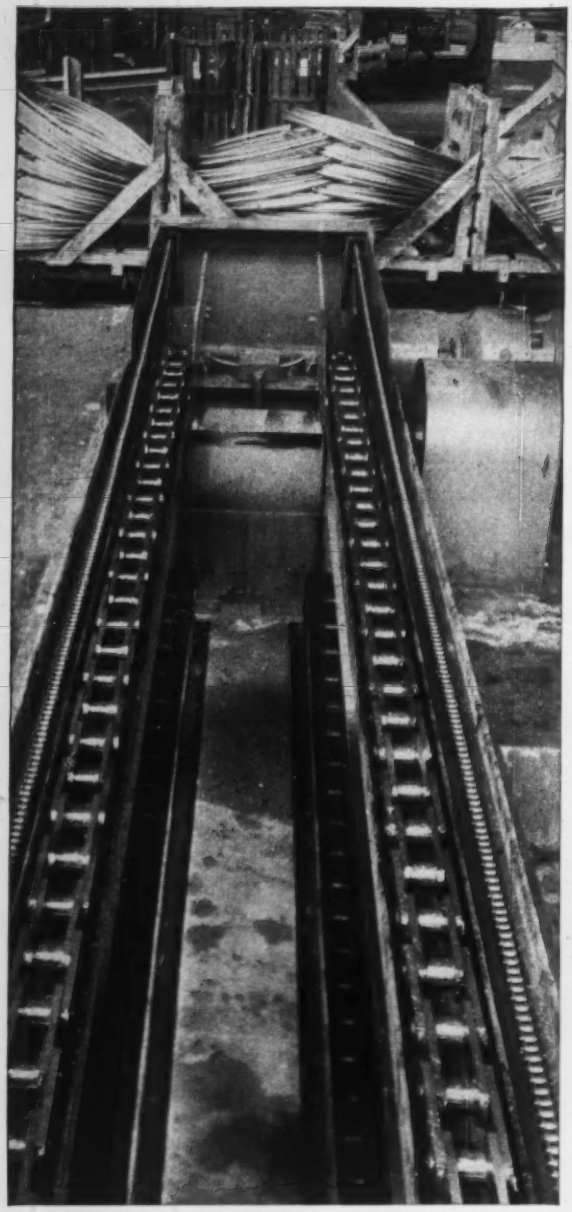
BLISS
SINCE 1857

E. W. BLISS COMPANY · Canton, Ohio

BLISS is more than a name—it's a guarantee

PRESSES • ROLLING MILLS • ROLLS • DIE SETS • CAN MACHINERY • CONTRACT MFG.

Link-Belt draw bench chains hold accurate pitch and sprocket contact



LINK-BELT 6-IN. PITCH SS-1326 CHAIN operates at speeds up to 400 feet per minute. Note strands of Link-Belt RC-80 roller chain which serve to return the gripper head back to the die stand so that another draw can be made.

Double strand SS-1326 bushed chain accommodates high operating speeds

This bushed type chain draws from one to five 130-ft. tubes at speeds up to 400 feet per minute on this 36,000-lb. draw bench. Design and structural features of Link-Belt SS class bushed chain make such high speeds possible.

Bushings perform operational function

Chain bushings play a major role in the operation of dual-chain draw benches. They engage a pair of pivoted hooks connected to the gripper head. The chain then pulls the gripper head and tubes through the die stand. When the draw is completed, the hooks are cammed away from the chain and the chain continues to operate.

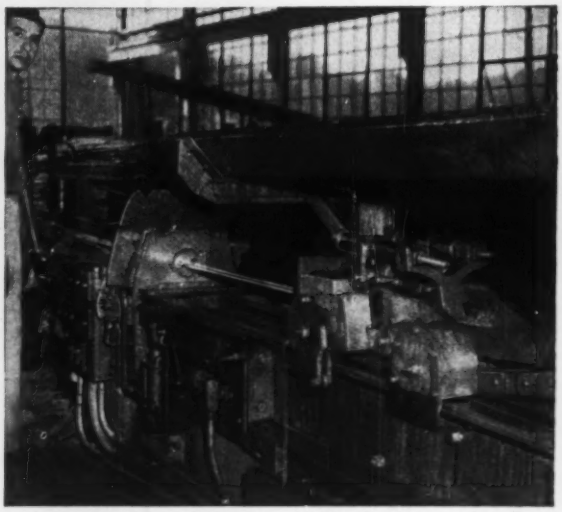
Structural advantages of bushed chain

Link-Belt SS class chain also offers rugged construction. The hardened steel bushings, securely fitted and locked in sidebars, give a durability and strength that permit even higher operating speeds than are possible with standard block chain.

Special machining of parts extends life of this draw bench chain

Whether it's for a 5000- or a 100,000-lb. bench, Link-Belt draw bench chains are built to last. Parts are accurately machined after hardening by a special process that assures longer chain life on even the highest chain pull applications.

SS class draw bench chains are available in a variety of pitches and strengths to suit any requirement. They are of all-steel construction, and well balanced. They are furnished in either bushed type or block link design. Close pitch control and correct sprocket contacting surfaces are maintained at all times.



LINK-BELT SS-1325 CHAIN, 130 ft. long, is used on each of four draw benches in this copper tubing redrawing plant. Accurate control of raw materials and manufacturing processes is your assurance of close pitch and correct sprocket contact.

HEADQUARTERS for chains, sprockets and other Link-Belt conveying and mechanical power transmission products is your nearby Link-Belt factory branch store or authorized stock-carrying distributor.

LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.809

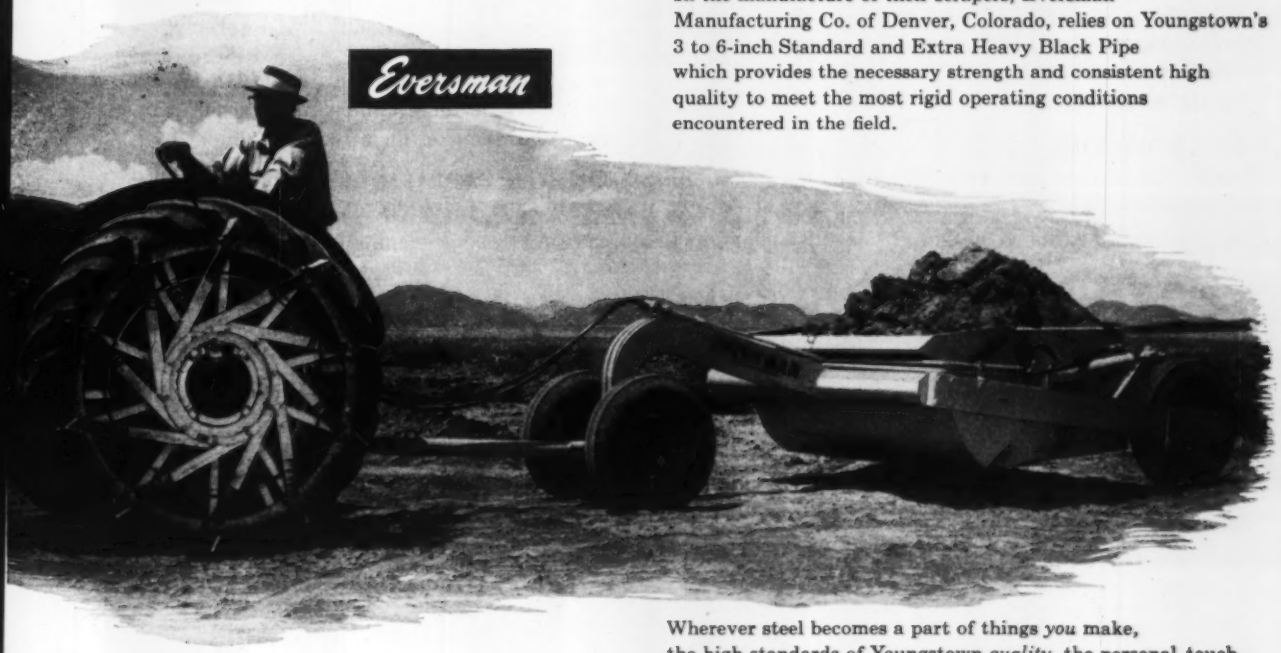
At Eversman's plant, *these tongue clevises produced from 3-inch Youngstown Standard Pipe, are being spray-painted prior to their assembly on finished scrapers.*

Accent on Excellence

Youngstown standard pipe

Lucky is today's farm operator that has a new Eversman hydraulically-controlled scraper to handle most of his land-farming jobs. By simply hitching to a tractor, he can easily prepare his land for increased per-acre income in the future.

In the manufacture of their scrapers, Eversman Manufacturing Co. of Denver, Colorado, relies on Youngstown's 3 to 6-inch Standard and Extra Heavy Black Pipe which provides the necessary strength and consistent high quality to meet the most rigid operating conditions encountered in the field.



Wherever steel becomes a part of things *you* make, the high standards of Youngstown *quality*, the personal touch in Youngstown *service* will help you create products with an "accent on excellence".

Manufacturers of Carbon, Alloy and Yoloy Steel
Youngstown, Ohio

QUALITY YOUNGSTOWN SERVICE

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY

now you can slash your

TELECONTROL*—a management tool—
Saves more than its cost in first 12 months

While management's attention has been aimed at increasing productivity of direct labor, non-productive labor costs have been climbing steadily. In some industries, the non-productive vs. direct labor ratio has almost doubled. To answer this costly management problem, Hancock Industries has developed TELECONTROL—simple, low-cost and highly effective equipment for controlling and reducing unproductive labor and supervisory costs through more efficient use of both manpower and production facilities.

Telecontrol is new, yet completely proven in several industries ranging from small companies producing hardware to giant electric appliance producers. The photo panel below explains how Telecontrol works. More important is what Telecontrol can do for management. Of the many profit-improving benefits, the main ones are:

CUTS DOWNTIME COSTS—of machines and direct labor. Telecontrol does this by letting production management "see" the operation of every machine from a central point. You can see exactly what is being produced at every point in the plant. Machine operators are shifted, without lost time, to other operations when required. Setup time is speeded. When mechanical troubles occur, Telecontrol makes possible immediate corrective action. Materials handling, too, is expedited by Telecontrol's ability to eliminate delays in supplying or removing stock.

CUTS SUPERVISORY COSTS—by eliminating unnecessary (and non-productive) time of foreman in chasing around the plant. With Telecontrol, the supervisor is at any trouble spot within seconds and can correct it without lost time.

BOOSTS PRODUCTION EFFICIENCY—by reducing idle time of production people to a minimum—and by locating and helping to identify causes of failure to maintain production standards. Yet, both machine operators and foremen are enthusiastic over Telecontrol as it makes their own jobs easier.

ELIMINATES PAPERWORK—At shift-end all production data is immediately available at a central source—and record-keeping processing is greatly

TELECONTROL, for either single or multi-shift operation, consists of only three basic elements—

. . . (left) a control and signal box at each production station (or machine) relays production information and serves as a point from which . . .

. . . (center) production supervisors, with belt-carried telephones, have direct communication with . . .

. . . (right) the control center. Here, separate panels for each production station indicate operating condition, production time, downtime, pieces produced, and balance left. An Intercom system ties in the entire plant.

unproductive labor costs

CASE HISTORY No. 1

Type of plant.....stampings
No. of machines.....200
TELECONTROL equipment cost..$70,000
1st year savings:
in unproductive labor costs....$80,000
in inventory, downtime, etc.....$20,000

streamlined for timekeeping, payroll, cost, inventory control or production-programming functions. Telecontrol reduces the paperwork of foremen and timekeepers to practically nothing.

BETTER INVENTORY CONTROL—Telecontrol, in anticipating completion of runs, eliminates overruns and underruns, permits more realistic inventory levels for greater economy. Telecontrol also helps improve manufacturing planning, and smooths out production loads in any plant of over 200 employees.

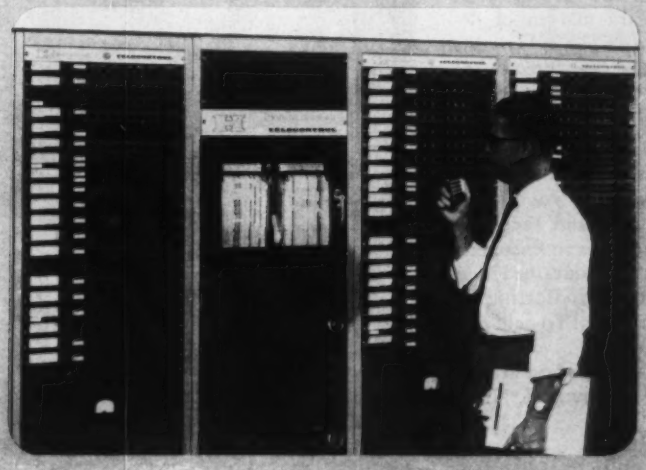
HELPS MANAGEMENT—Telecontrol equipment "brings" every operation in the plant to production management as it happens. All the information needed is readily available—now, not days or weeks later. It cuts unnecessary costs, provides accurate data and improves methods. Yet, Telecontrol equipment is inherently simple and foolproof, easily installed and serviced. It costs so little that the savings in unproductive labor costs alone will pay for it in 12 months or less. Full details on Telecontrol equipment can be obtained by writing:

HANCOCK

TELECONTROL DIVISION

HANCOCK INDUSTRIES, INC. • JACKSON, MICHIGAN

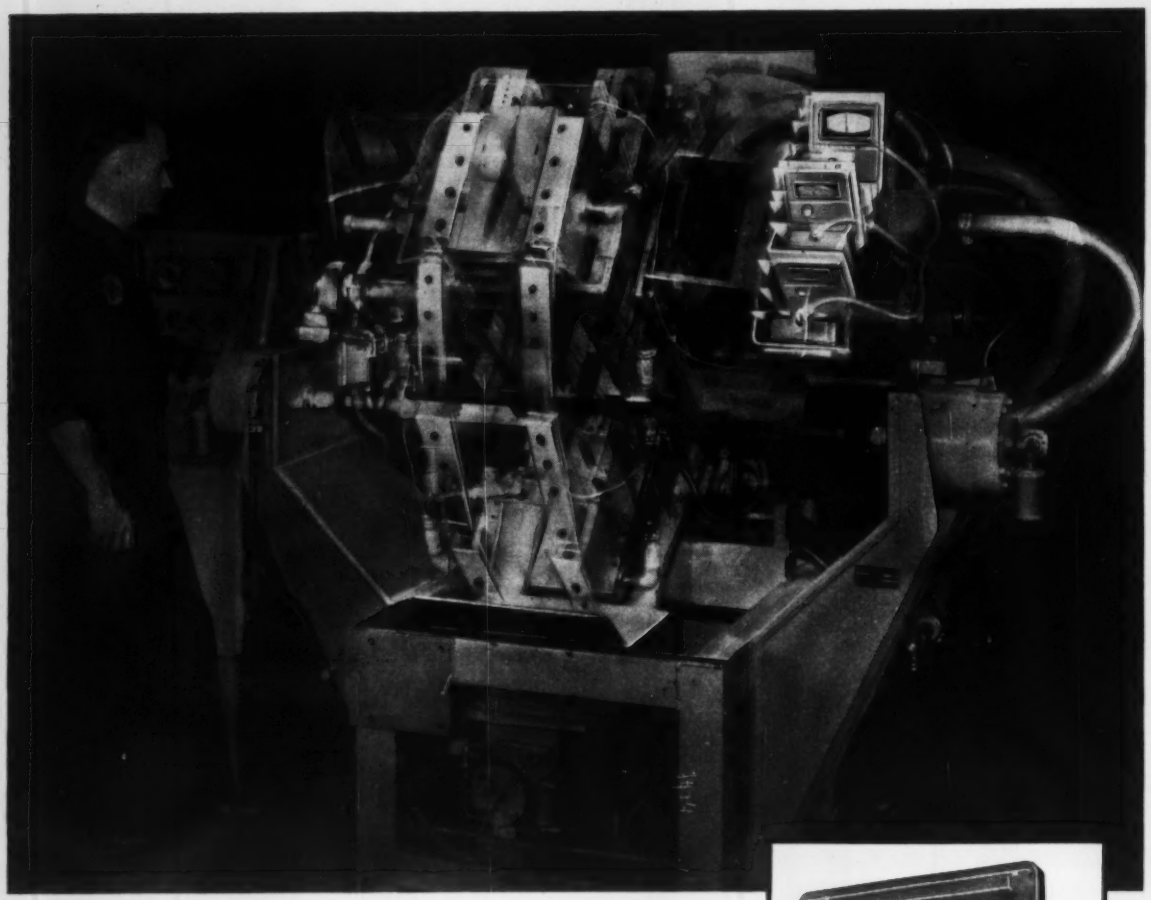
*TELECONTROL Production Control Equipment



Industries to which TELECONTROL is readily adaptable include:

- †Appliance Manufacturing (major)
- †Appliance Manufacturing (small)
- †Automotive
- †Electrical Manufacturing
- †Foil Printing
- †Paper Processing
- Machinery, except electrical
- †Metal Parts Fabrication
- †Molded Plastic Forming
- Publishing
- Textile
- †Tool Manufacture

†Indicates installations already in use



A Partlow Model MFS indicating controller is shown in action in this "multiple exposure" shot of a Holo-Core Automatic Molding Machine manufactured by Spo, Inc., Cleveland, Ohio.

The Temperature Control Built to
SHRUG OFF SHOCK
2438 Times a Day

Every working day, the Partlow Temperature Control in this photo takes between 2400 and 2500 solid "roundhouse punches" from the shell-molding machine to which it is attached.

But despite jarring shock and vibration, and a constant barrage of foundry dust, the Partlow goes right on delivering precision control—without letup or breakdown.

Actually, only a control as simple and rock-solid as the Partlow could withstand this kind of punishment! Because only the Partlow contains no hairsprings, or delicate gadgets.

All Partlow thermal elements of the same range are interchangeable *on the job*, too. There's no time lost waiting for your control to come back from the factory. And you get this extra margin of dependability *without loss of accuracy*. Partlow controls are precise to within 1% of scale in any one of 10 ranges from −30° to 1100° F.

If you use or manufacture equipment within this temperature range, there's a Partlow to fit your application exactly . . . and save you money, too. Available in Pneumatic, Electric or Self-Contained Gas types, in recording, indicating or non-indicating models! To field test any Partlow control . . . or to obtain full details write, The Partlow Corporation, New Hartford, N. Y. Dept. S-259

Export: Ad. Auriema, Inc., 85 Broad St., New York 4, N. Y.

A complete absence of gadgets and superfluous parts, as seen in this open view of the new MFS indicating control, explains the Partlow's unique ability to function accurately even under the most severe operating conditions.

You can pay more but you can't buy better than

PARTLOW

TEMPERATURE CONTROLS

Memo to a Man of "Parts"

The number of different parts made from Roebling High Carbon Specialties, Flat Wire and Spring Steel are close to countless.

Some things you can count on, though, are the consistent dimensional and mechanical uniformity you get with any Roebling High Carbon Specialty. They are the qualities that contribute to speeding *your* production and cutting *your* costs.

They are high qualities that make for high values. Next time you need flat wire or spring steel, specify Roebling. Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

Storage bins into which sand ingredients are conveyed by a Fuller-Kinyon Conveying System. Note the pipe-line system which permits ingredients to be conveyed into their respective bins.

One of two Fuller-Kinyon Pumps which convey sand ingredients to storage bins and from bins to mixers.

FULLER-KINYON CONVEYING SYSTEM HANDLES THREE DIFFERENT MATERIALS EFFICIENTLY, WITHOUT WASTE

To reduce costs and speed up handling of foundry sand ingredients with minimum waste, General Steel Castings Corporation, Granite City, Illinois, installed a Fuller-Kinyon Conveying System.

Here's what it does for them—

The system unloads corn flour, silica flour and bentonite from hopper bottom cars by means of Fuller-Kinyon Pumps which convey these materials through pipe lines to a number of storage bins. The flexibility of the system makes it possible to unload cars in a fraction of the time that would be required manually, *and*, waste due to spillage is eliminated. Two pumps used in the operation can be moved on narrow gage tracks for spotting under cars or bins. One pump is used mainly for unloading and delivery to storage—the other for delivery from storage to supply bins above the mixers. However, it is possible to unload cars and reclaim from storage simultaneously. Where bins are located so that they cannot discharge directly to a pump, an F-H Airslide® conveys from bins to the pump.

Prior to the Fuller installation, material was received in bags and manually unloaded, stored and transported to the mixers. It figures—*costs were much higher*. Now, waste has been eliminated! Another important feature—the company has realized extra savings by purchasing materials in bulk.

Fuller air-conveying systems are in operation in hundreds of plants throughout industry, cutting costs and increasing profits, day in and day out. The next time you have a materials-handling problem, why not get in touch with Fuller . . . chances are you will also profit.

FULLER COMPANY GENERAL AMERICAN TRADE MARK

Fuller

. . . . pioneers in harnessing AIR

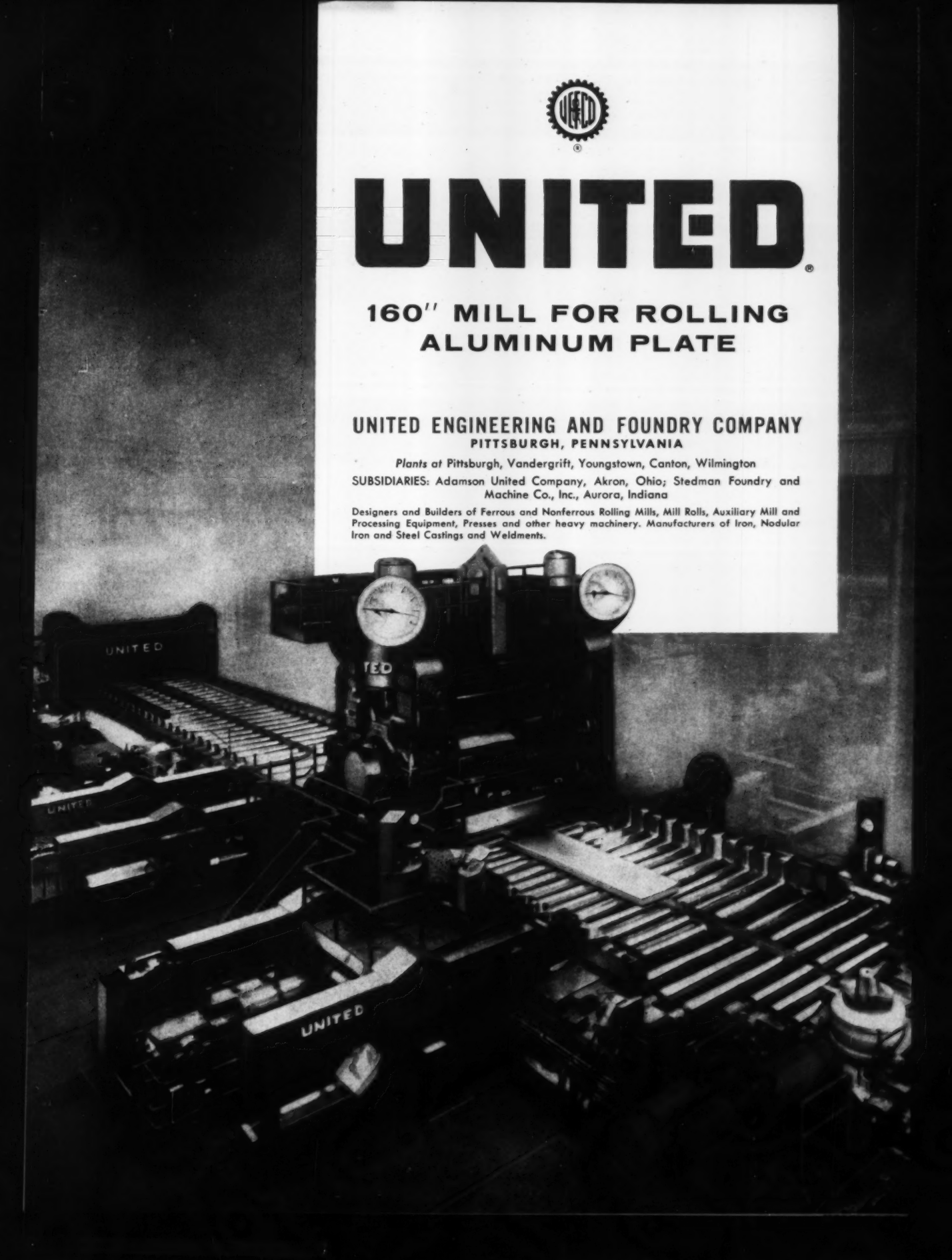
FULLER COMPANY

160 Bridge St., Catasauqua, Pa.

P-168
4038

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION

Birmingham · Chicago · Kansas City · Los Angeles · San Francisco · Seattle



UNITED®

160″ MILL FOR ROLLING ALUMINUM PLATE

UNITED ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

WORLD'S LARGEST

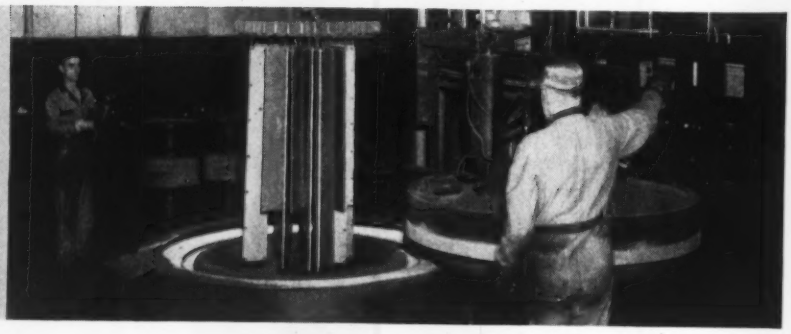
Gas-Fired Homocarb® Furnace Installed

"This equipment took a sizable bite out of our limited expansion capital," says Carl H. Muehlemeyer, President of O. T. Muehlemeyer Heat Treating Company, commercial heat treaters in Rockford, Ill., "but we chose it deliberately after much consideration because we know that with it, we can give our customers the quality and service they require at a competitive cost."

Muehlemeyer points out that, "This furnace is part of a quality-control expansion program extending over the next several years. It reached us from Leeds & Northrup ready for installation with complete instrumentation for Speedomax temperature control and Microcarb atmosphere control."

Only recently has a complete line of gas-fired Homocarb furnaces, equivalent in design, construction and instrumentation to electrically-fired units been introduced. Combining precision control of carbon potential with the economy of gas-firing, these furnaces can be used interchangeably for case carburizing, carbon restoration, homogeneous carburizing or hardening. These factors strongly influenced Muehlemeyer's choice.

A load of SAE 4140 steel slidebars being unloaded from Muehlemeyer's gas-fired furnace. Carbon and temperature control panels can be seen at right. Above is the same furnace . . . measuring 15 feet high by 6½ feet in diameter . . . ready to leave the L&N shipping dock in Philadelphia.



For more information *just write us at 4957 Stenton Ave., Phila. 44, Pa.*

LEEDS instruments LN NORTHRUP automatic controls • furnaces

Spring steel within this range...

FOR THE MOST EXACTING NEEDS KNOWN TODAY!

• That this is the age of specialization is certainly true in the use of steels. And in this regard *Athenia Steel* customers benefit especially by two not-too-common factors. First, by extreme control of quality and uniformity, unsurpassed, seldom equalled *anywhere!* Secondly, by painstaking technical service to determine or develop precisely the right steel for any special need.

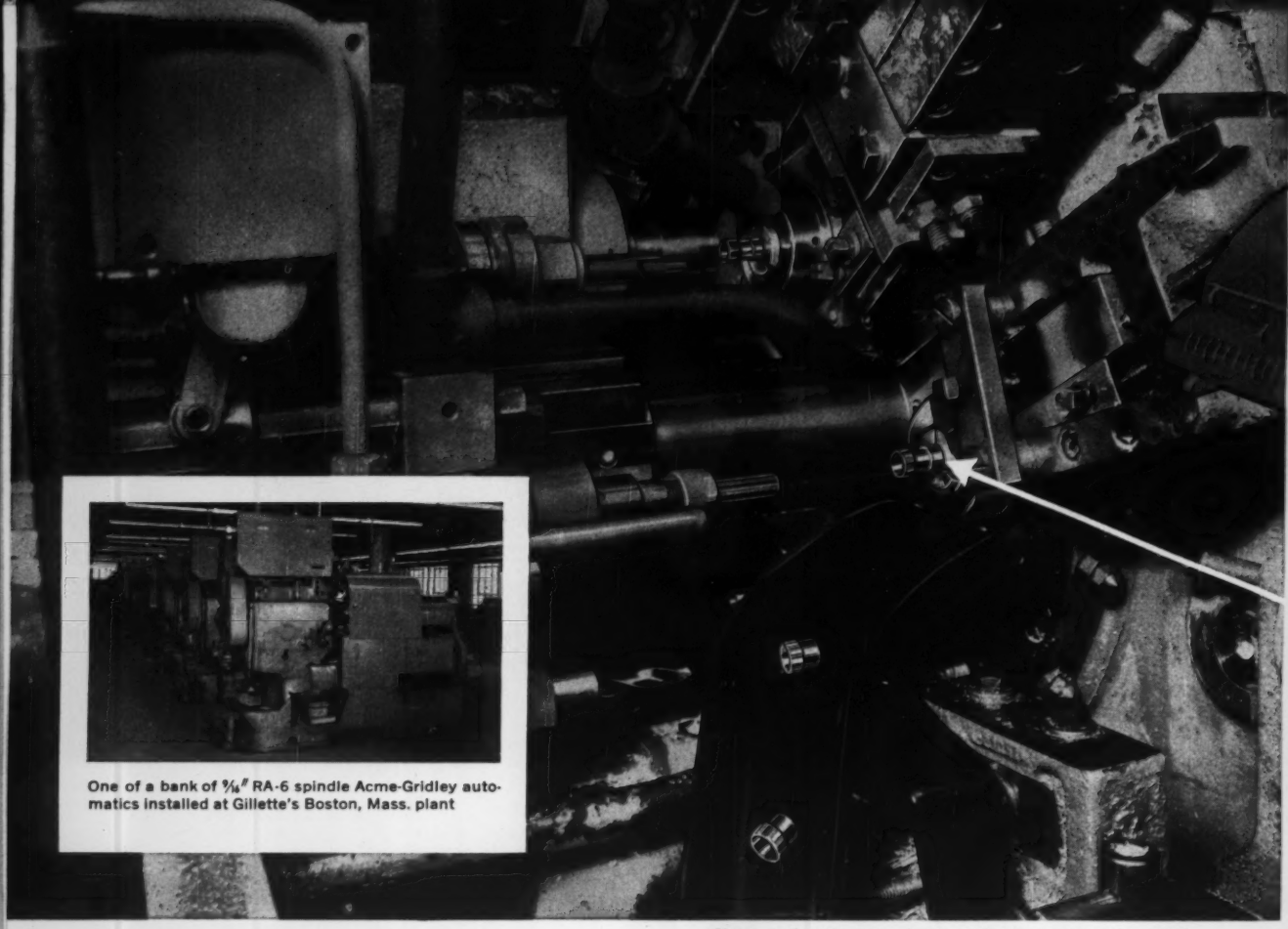
Here at Athenia we concentrate on cold rolled high carbon flat steels, custom made of .45 carbon and higher, in widths from .015″ to 16″ and thicknesses from .001″ to .065″. Full range of finishes and tempers. We also produce special narrow width stainless, and the new super-tough, corrosion resistant spring material, Nilcor*.

For a new and profitable experience in service and in steel controlled precisely to *your* needs... try us!

*Trade Mark National-Standard Company

NATIONAL NS NATIONAL-STANDARD **STANDARD**

NATIONAL-STANDARD, Niles, Mich.; *tire wire, stainless, music spring and plated wires, flat and tubular braid and wire cord*
WORCESTER WIRE WORKS, Worcester, Mass.; *music spring, stainless and plated wires, high and low carbon specialties* • **REYNOLDS WIRE, Dixon, Ill.;** *industrial wire cloth*
WAGNER LITHO MACHINERY, Secaucus, N. J.; *metal decorating equipment* • **ATHENIA STEEL, Clifton, N. J.;** *flat, high carbon spring steels*
CROSS PERFORATED METALS, Carbondale, Pa.; *industrial, commercial, and decorative perforated metals*



One of a bank of 7/16" RA-6 spindle Acme-Gridley automatics installed at Gillette's Boston, Mass. plant

Close up of tooling zone showing adjusting knob in 5th position

Precisely Formed, Marked, Knurled,

Broached, Micro-finished, Reamed and Tapped . . .

ON ONE ACME-GRIDLEY AUTOMATIC

in *4½ Seconds!*

The adjusting knob on this new adjustable razor is but one of its several precision components made by The Gillette Safety Razor Company on 5/16" Acme-Gridley six spindle bar automatics. The requirements were extremely exacting, *with as many operations as possible performed in the primary setup!*

For example: nine positions are stenciled on a turned portion of the O. D. with interrupted knurling held in exact peripheral location to the marking. In addition, close tolerance hole sizes are involved and *all* external burrs completely removed. All tools had to be synchronized to produce the exacting number-knurl relationship on the periphery.

Working in close cooperation with Gillette engineers, National Acme specialists took full advantage of the wide-open tooling zone, independently operated tool slides and the extreme accuracy and flexibility of direct camming . . . to perform an ingenious job of tooling. Many operations normally considered "secondary" were accomplished in the primary setup. Costly rehandling and "second machine investments" were reduced.

Write or ask one of our representatives for the complete story on the industry's most modern approach to *your* cost reduction problem.

National Acme

The National Acme Company
189 E. 131st Street
Cleveland 8, Ohio

Pioneer in Circumferential Automation

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

A

new concept

to simplify your spring

design and purchasing problems

Select-A-Spring

ready-to-use engineered standard springs

Now you can select compression or extension springs from hundreds of ready-to-use, engineered standard-specification sizes. No fuss or paper work—no blueprints or drawings necessary. Select-A-Spring enables buyer or designer to pinpoint his needs without delay. Simply match your requirements to the Select-A-Spring list, order by catalog number, quantity and material. Especially convenient where quantities are moderate.

Select-A-Springs are pre-engineered, using wire certified to military and aircraft specifications, in various lengths, diameters, rates, and loads up to 20 lb. They meet industry and military standards. Material is either music wire or stainless steel. Compression springs are squared and ground. Extension springs have regular loops. Other ends and loops optional.

Whether your need is immediate or future, write now for the A.S.C. Select-A-Spring list. Keep it handy as a time-saving, useful spring service.

Associated Spring Corporation General Offices: Bristol, Connecticut

Wallace Barnes Division, Bristol, Conn. and Syracuse, N. Y.
B-G-R Division, Plymouth and Ann Arbor, Mich.
Gibson Division, Chicago 14, Ill.
Milwaukee Division, Milwaukee, Wis.
Raymond Manufacturing Division, Corry, Penna.
Ohio Division, Dayton, Ohio
F. N. Manross and Sons Division, Bristol, Conn.
San Francisco Sales Office, Saratoga, Calif.
Seaboard Pacific Division, Gardena, Calif.
Cleveland Sales Office, Cleveland, Ohio
Dunbar Brothers Division, Bristol, Conn.
Wallace Barnes Steel Division, Bristol, Conn.

Canadian Subsidiary: Wallace Barnes Co., Ltd., Hamilton, Ont. and Montreal, Que. Puerto Rican Subsidiary: Associated Spring of Puerto Rico, Inc., Carolina, P.R.

5907

Rounds . . flats . . extra wide flats . . squares . . hexes. Always available in a full range of popular standard sizes and lengths.

Cold-drawn . . turned and polished . . ground and polished. Exceptional size accuracy, straightness, concentricity, and uniformity. Produced to standard or special tolerances.

Carbon and alloy steels. La Salle produces a broad line of high quality cold-finished steel bars in AISI and SAE carbon and alloy grades.

Screw machine steels. For improved machinability and increased production, La Salle offers the finest lead treated or resulphurized steel bars.

Furnace treated steels. Careful furnace treatment develops required physical properties through quenching and tempering. Annealing improves machinability.

—AND THESE EXCLUSIVE SPECIALTY STEEL BARS:

FATIGUE-PROOF® . . produced by "e.t.d."® (Elevated Temperature Drawing) process. Guaranteed 140,000 psi minimum tensile. Fast machining. No heat treating necessary.

STRESSPROOF® with copper . . contains copper for improved machinability and other properties. Guaranteed yield, 100,000 psi in all sizes.

LA-LED® . . a lead bearing, fast machining steel. Machines twice as fast as B-1112 . . 45% faster than B-1113. Excellent ductility . . sounder cross section. Permits better carburizing.

Super LA-LED® . . fastest machining steel ever commercially developed. Ideal for parts which previously could be machined economically only from brass. Excellent ductility and carburizing qualities.

Ask for any or all of these reference materials on La Salle cold-finished steel bars

La Salle STEEL CO.

1414 150TH STREET
HAMMOND, INDIANA

Please send the following literature:

- ☐ *How to make your own machine and repair parts quicker and easier*
- ☐ *Wall chart listing 241 AISI grades of cold-finished steel bars*
- ☐ *La Salle Leaded Steels*
- ☐ *A new material . . (the story of FATIGUE-PROOF steel bars)*
- ☐ *Today's Improved La Salle STRESSPROOF steel bars*

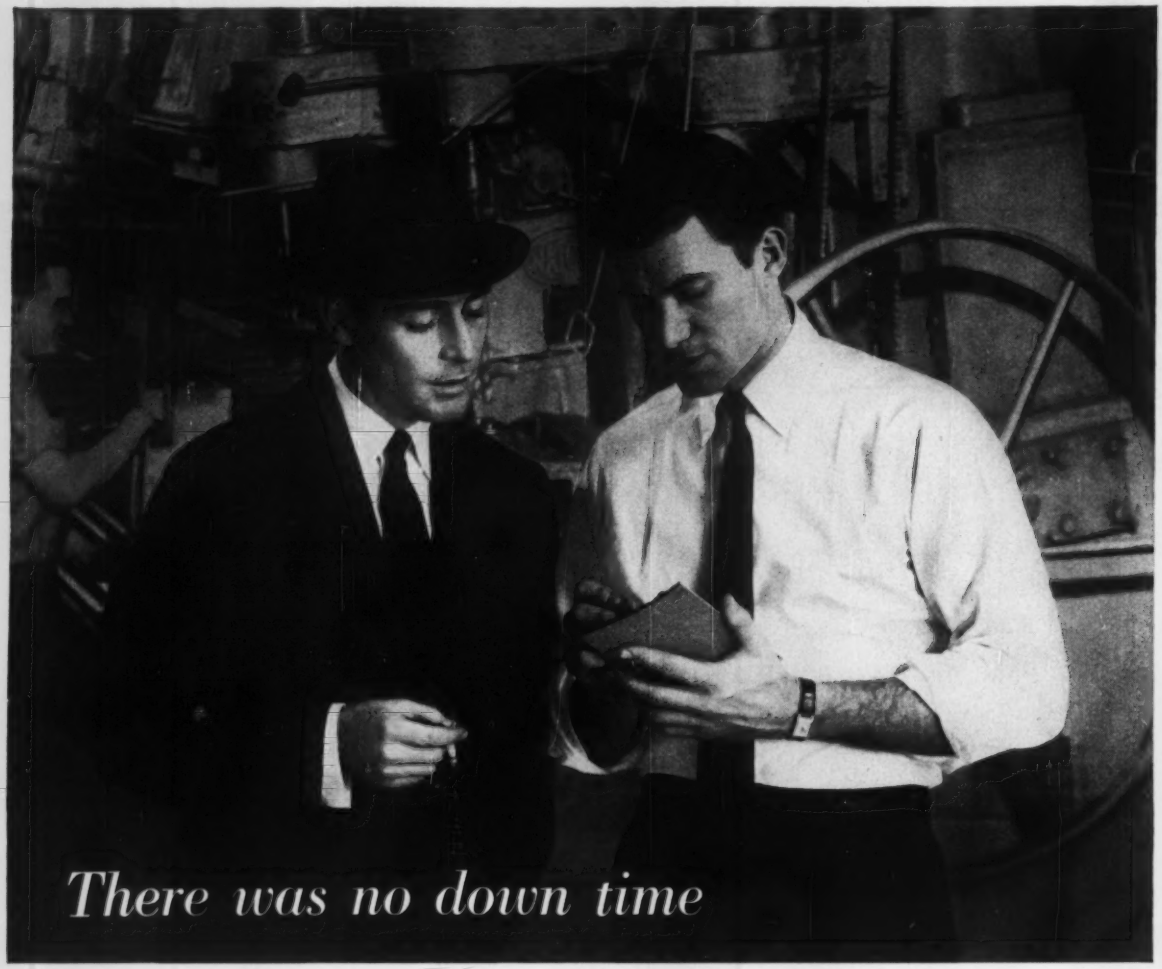
Name _____

Title _____

Company _____

Street _____

City _____ *Zone* ____ *State* _____



at Johnson's Machine Company

. . . with the help of the Ætna Life's Business Planning Department

When Fred Johnson died last year his thriving machine shop didn't have to go out of business . . . experienced no down time . . . because Mr. Johnson was a progressive and foresighted man.

With the help of his Ætna Life representative, attorney and accountant, he set up a plan which gave his wife in cash the full going concern value of the business. This same plan provided for a smooth transition of the ownership to two of his key employees — avoided financial chaos in the business and disaster to his own family.

If you own or operate any kind of business, it will pay you to investigate the vital need for a business continuation plan — and no one is better equipped to serve your interests than the Business Planning Department of your local Ætna Life General Agency.

ÆTNA LIFE
INSURANCE COMPANY

Affiliates: Ætna Casualty & Surety Co. • Standard Fire Insurance Co. • Hartford, Conn.

CARBO-SIL® No. 4*

The Only Low-cost and Consistent Method of Adding Silicon Carbide in Your Cupola

A positive silicon source that:

* Cuts Costs
* Increases Machinability
* Improves Fluidity
* Controls Chill

CARBO-SIL No. 4, a silicon carbide addition for cast iron cupolas, comes in 10 and 15-pound units encased in steel containers.

BECAUSE CARBO-SIL No. 4 comes in steel containers, every crystal of the pre-crushed silicon carbide is *fully* protected until it reaches the significant melting zone of the cupola. Then it *completely* reacts and goes into solution.

CARBO-SIL No. 4 is competitively priced with silicon carbide in briquette form. You save money because there's no waste. If briquettes are made sturdy, they only partially dissolve and often are found in the drop. If made fragile, they break up prematurely and are partially blown out the stack.

There are 4½ pounds of available silicon (as silicon carbide) in the 10-pound unit and 6¾ pounds in the 15-pound unit. Each container adds almost a pound of steel to your charge at no extra cost.

Write for details.

Safe Outdoor Storage

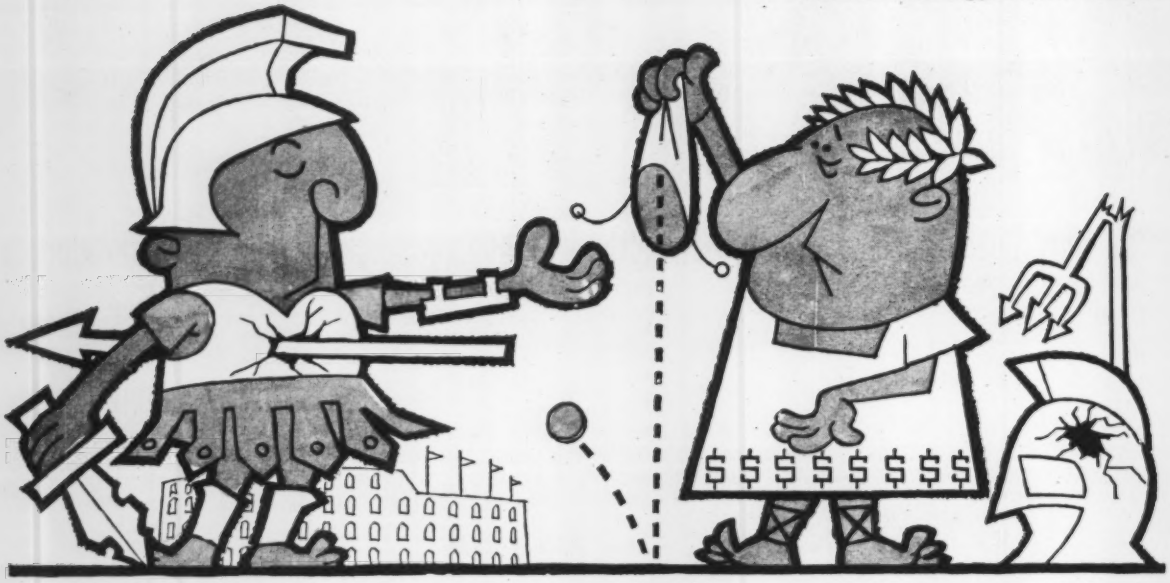
CARBO-SIL No. 4 is packed in palletized, waterproofed and top-strapped units for space-saving outdoor storage.

AMMET

AMERICAN METALLURGICAL PRODUCTS COMPANY

3600 FORBES AVENUE / PITTSBURGH 13, PA. / PHONE MUSEUM 2-7031

Man's Eternal Struggle with the Machine



WITH ALL THE COSTS OF DOING BUSINESS RISING STEADILY, PROFIT IS MORE ELUSIVE THAN EVER!

How long can the cost of "getting new equipment to work right" be buried in overhead?

No matter how attractive the original price of the equipment, it's false economy if the price tag *did not* itemize the extra money required to get it into production!

To your great responsibility for improving manufacturing processes has been added an *extra* concern for that old standby, catch-all type goodfellow called "overhead".

Overhead can no longer afford the labor and hard, cold cash-money often needed to make new equipment operate properly.

Sciaky knows about "overhead", too. That's why Sciaky resistance welding and production equipment is built to satisfy the requirements of *your* particular application. That's why Sciaky equipment is thoroughly tested and proved to do that particular job *before shipment.*

The result protects the profit your manufacturing operations can earn by (1) providing only the right equipment at the right price, (2) minimizing the lost time and cost of production try-out, and (3) minimizing rejects and costly re-working.

Why take less than the full advantage of consulting with a Sciaky Application Engineer the next time you are considering equipment. No obligation, of course.

A successful manufacturer of double-bowl kitchen sinks took that advantage. As a result, they replaced the previous high-reject, unprofitable method of fabrication with Sciaky resistance welding equipment. Within only ten days of installation, over 10,000 sink units were produced with less than a 1% scrap factor. Write for "Resistance Welding At Work", Volume 4-No. 6 for the details.

SCIAKY

SCIAKY BROS., INC., 4909 W. 67th STREET, CHICAGO 38, ILLINOIS • POrtsmouth 7-5600

World's biggest dump truck—made with USS "T-1" Steel—hauls 165-ton loads at 35 mph. Western Contracting Corp. conceived the truck, had it designed by Charles W. Jones, engineering firm of Los Angeles. Fabricators of box and frame: Eaton Metal Products Corp., Omaha.

World's biggest truck made 25% lighter with USS "T-1" Steel

Your first impulse is to dive for the ditch when you see this mastodon of trucks roaring down the haul road at Oahe Dam near Pierre, South Dakota. But if you're an equipment builder, you will wonder how they got the tremendous strength necessary without adding too much dead weight.

That was the problem faced by the Western Contracting Corporation of Sioux City, Iowa when they decided to build the biggest possible dump truck. It is an 18-wheel, 750-hp semi-trailer that is currently hauling a payload of 110 yards or 165 tons. The truck is 55 feet long, 16 feet wide and 14 feet high.

25% lighter. To get this high capacity with the least weight, they built the box and frame of USS "T-1" Constructional Alloy Steel. "T-1" Steel had a minimum yield strength of 90,000 psi but is now available at 100,000 psi. Western estimated it saved 12½ tons in dead weight or 25% of the trailer's weight.

Good fabricating properties. Because USS "T-1" Steel can be readily formed and welded, all members could be built up from plates. Reinforcing for the box was formed into channels through which exhaust gases are piped to keep the load from freezing in cold weather.

High resistance to impact abrasion. Dumping a 165-ton load in a few seconds causes terrific abrasion. "T-1" Steel is noted for its ability to take this kind of punishment, and it gives much longer service than ordinary steel.

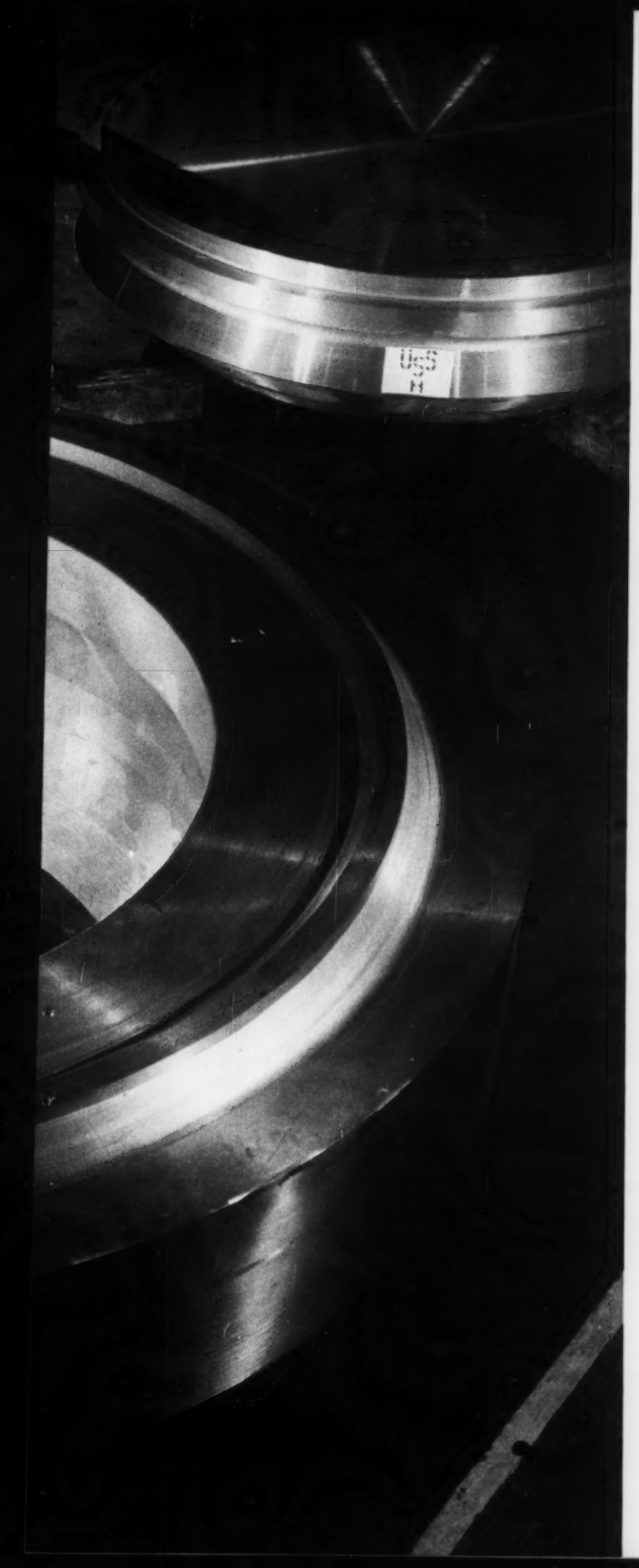
In addition to 100,000 psi "T-1" Steel, we produce three brands of USS High Strength Steel in the 50,000 psi Yield Point range—MAN-TEN, COR-TEN and TRI-TEN. Each has its own characteristics that make it ideal for certain applications in construction and mining equipment. Find out how these steels can reduce weight, increase strength, and lower your operating costs. Address United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS, "T-1," COR-TEN, MAN-TEN, and TRI-TEN are registered trademarks

United States Steel Corporation – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

United States Steel

USS



First atomic aircraft carrier uses USS Quality Steel Forgings

The Navy is now building the ENTERPRISE, the world's first nuclear-powered aircraft carrier. You won't hear much about it because of security, but if you had visited U. S. Steel's Homestead plant a few weeks ago, you could have inspected two of the parts of the ENTERPRISE'S power system. You see them in the picture—a closure head flange and a top disc for one of her eight reactor vessels. They are USS Quality Forgings.

The top disc will be seated inside the flange and both parts will be welded to other sections to form a single, sealed reactor vessel. The top disc weighs 36,750 pounds and the flange weighs 74,000 pounds. In service, these parts must withstand high pressure and radioactivity. The steel must be of excellent quality.

Manufacture of these Ni-Cr-Mo alloy steel parts included forging, preliminary heat treating and preliminary machining. This was followed by quenching and tempering. Then came a battery of tests: ultrasonic inspection, tangential tensile tests, Charpy V notch impact tests, grain size tests, bend tests and magnetic particle inspection.

These are just two examples of the many forged flanges, discs, rings, heads, cylinders, and bored pipe that United States Steel has produced during the past few years for industrial and marine nuclear applications.

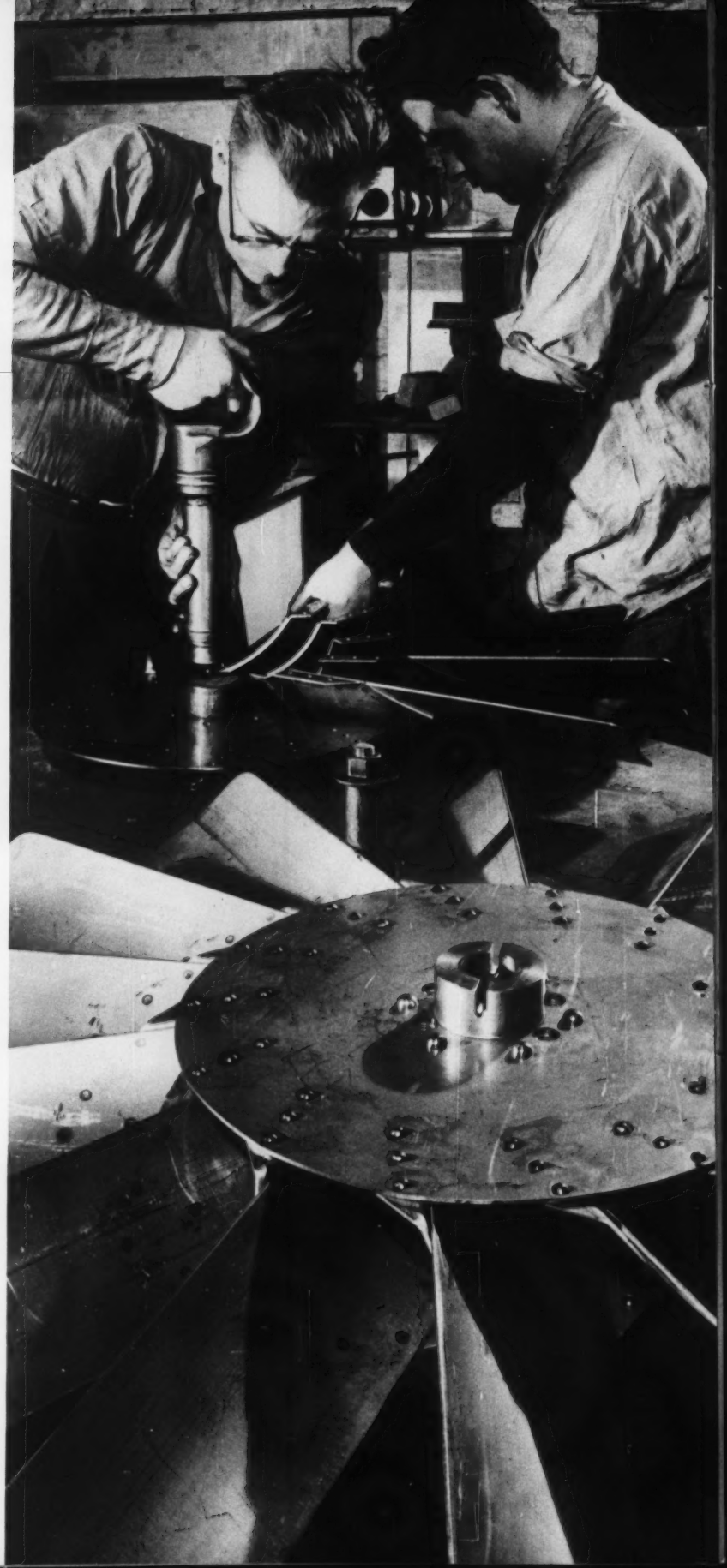
These two forgings have an especially critical job to perform, so they were made by top-skilled men using the finest equipment—the same men and equipment that make *every* USS Quality Forging. We will appreciate your inquiries or requests for our free 6-page booklet on USS Nuclear Forgings. Write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. *USS is a registered trademark*

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

USS

STAINLESS STEEL
RIVETING INFORMATION



*

Check for flaws, down by the rivet's side

Make a careful selection and inspection of stainless steel rivet stock. Use only smooth, centerless-ground or cold-drawn stock with a uniform fine-grain structure for maximum toughness and impact strength. Check the heads and sides of the rivets for seams, slivers, splits or other flaws. A white pickle will enable you to detect defects more easily.

Stainless steels are stiffer than carbon steel so you need more power to drive the rivets. A hydraulic riveter is best. If you use a pneumatic hand riveter, increase the air pressure—90 lbs. or more will generally do the job.

Rivet holes may be drilled or punched —*preferably drilled*. If you do punch them, be sure to ream out the holes to remove strained or distorted metal. Allow 1/64" for clearance. You'll find that stainless steel isn't difficult to rivet, it's just different.

You'll do a good job on *all* stainless steel fabrication when you follow our 130-page manual. If you haven't received your free copy, write on your company letterhead for our "Stainless Steel Fabrication Book," United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. *USS is a registered trademark*

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

USS

AMERICAN ORIGINALS IN IRON AND STEEL

How iron plates helped win the West

In the early 1800's, when Lewis and Clark made their historic pioneering trip across the continent, their supplies were limited to bare necessities. Strangely, however, among these necessities were a number of *small iron plates.*

The Indians of the Northwest valued these plates very highly. They would trade approximately a bushel of grain for a piece of iron only 4 inches square. This metal enabled them to make better axes, implements, and weapons . . . to be suddenly transferred from the Stone Age to the Iron Age. Thus *iron* became a means of gaining the Indian's friendship, while indirectly helping to sustain the white man on his first coast-to-coast expedition.

The growth of our iron and steel industry, like the development of our country, also depended on the ingenuity of many men and the perfecting of many products. Among these products was Baker's MAGDOLITE, which today helps produce more uniform ingots . . . at lower refractory cost. It has proved superior in composition, preparation, strength, economy, and quality. Make a note of MAGDOLITE now . . . a name it will pay you to remember.

ANOTHER AMERICAN ORIGINAL

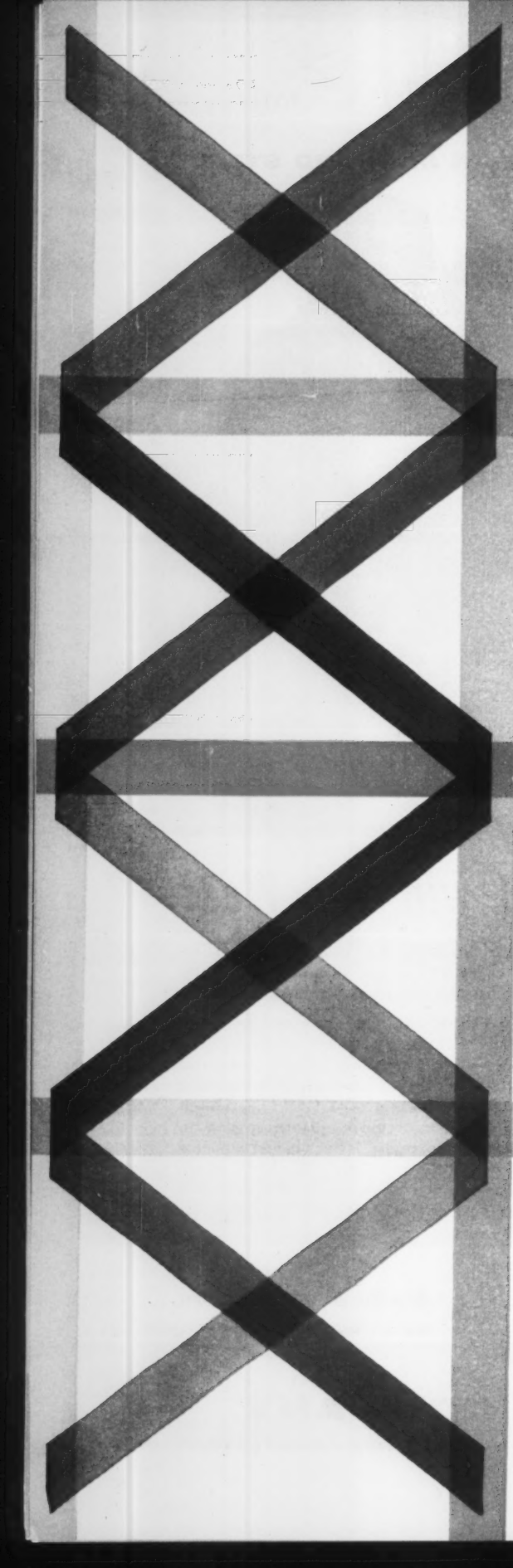
JEBCO
PRODUCTS
SINCE 1889

BAKER'S MAGDOLITE

The original dead-burned dolomite

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO



The pit nobody liked...

except our customers

This is of course our one-way fired soaking pit . . . fired from the top.

The location of the burner is only one of the features responsible for its enthusiastic acceptance. Most important however are the 30 years of experience and refinements which we have built into the pit since we first introduced it.

That is why, today, it is the pit everybody respects . . . especially our customers.

STEEL MILL, HEAT TREAT, GLASS DIVISIONS

SURFACE COMBUSTION CORPORATION

2408 DORR ST., TOLEDO 1, OHIO

wherever heat is used in industry

Worldwide engineering and manufacturing facilities through associates in: Australia • Belgium • France Germany • Great Britain • Italy • Japan

Surface

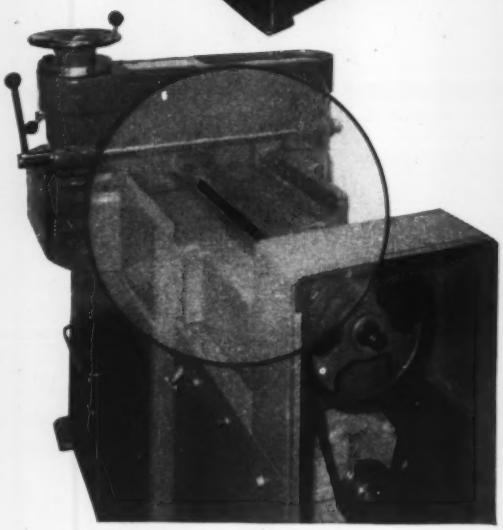
LABOR and PARTS SAVINGS

TURN *PROBLEMS* INTO

PROFIT$

with the

Saginaw Screw



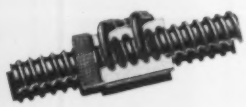
"WE USE ONE COMPACT SAGINAW SCREW IN PLACE OF THREE COMPLEX AND COSTLY PARTS NEEDED BEFORE on our printing plate PlateShaver. The Saginaw Ball Bearing Screw has cut our manufacturing time and material costs considerably. And our product has more **S**ales **A**ppeal because our PlateShaver now has considerably less mechanical parts and thus less potential mechanical trouble and maintenance," *says Mr. Lee Hammond, President of Hammond Machinery Builders, Kalamazoo, Michigan.*

You can turn *your* product problems into profits, too, when you switch from inefficient actuation methods to the virtually frictionless Saginaw b/b Screw for greater Sales Appeal!

The Saginaw Screw converts *rotary* motion into *linear* motion with over 90% efficiency. No wonder progressive manufacturers are saving so much time, power, weight, space and cost by simply switching from inefficient acme screws or costly chain drives and hydraulics to these versatile Saginaw Screws.

They have been produced from 1½ *inches* long for delicate electronic controls to 39½ *feet* long for huge machinery.

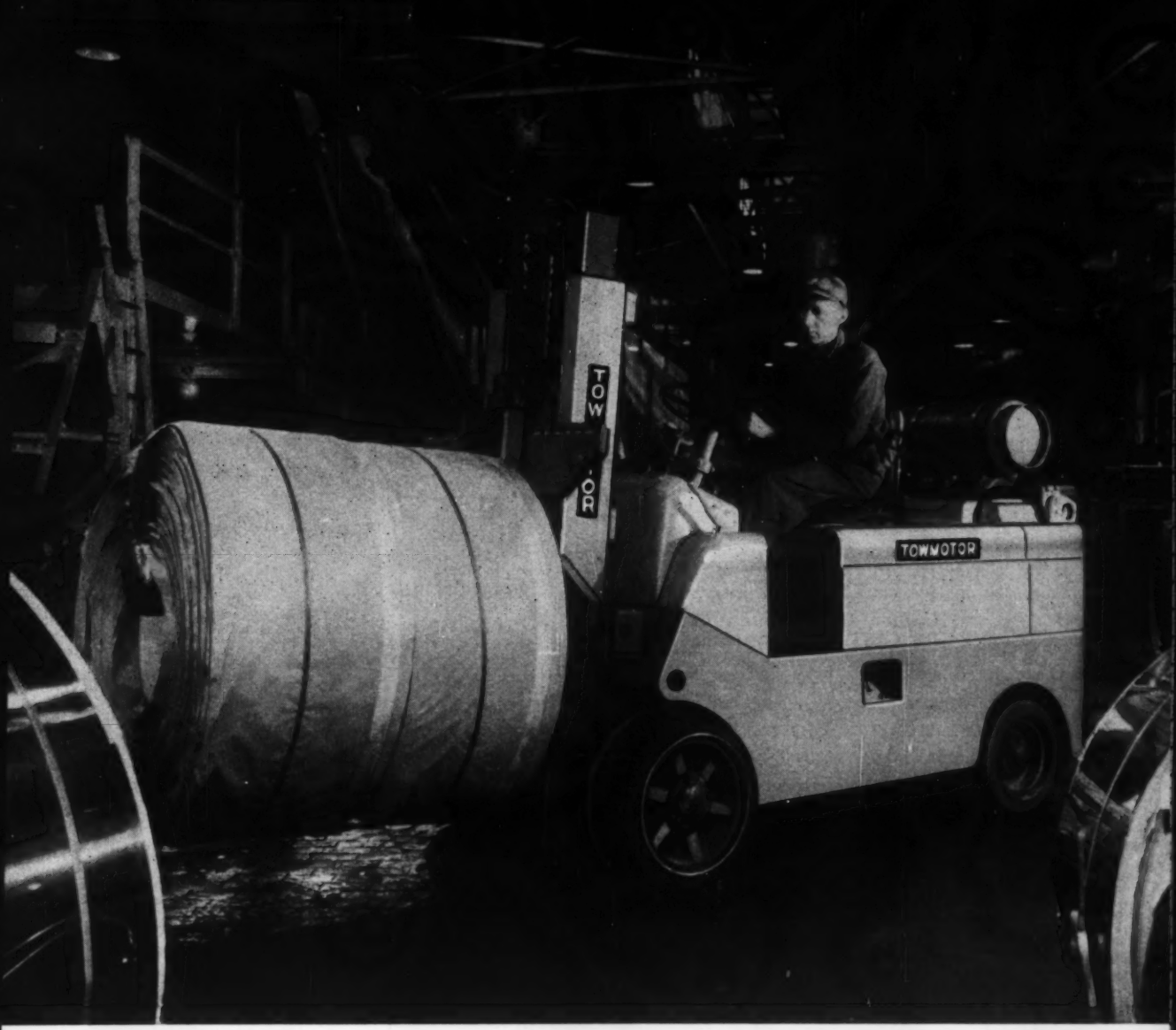
Perhaps the Saginaw Screw can give *your* products that vital new Sales Appeal you're looking for right now. To discover how, simply write or telephone Saginaw Steering Gear Division, General Motors Corporation, Saginaw, Michigan—*world's largest producers of b/b screws and splines.*



The Hammond PlateShaver uses one Saginaw Screw to eliminate a gear speed reducer, automatic safety clutch, and chain drive mechanism. Results: lower manufacturing cost and sales price and more trouble-free operation.

Give your products NEW SALES APPEAL... switch to the Saginaw

WORLD'S MOST EFFICIENT ACTUATION DEVICE ball bearing Screw



Greatest get-up-and-go...

Of all fork lift trucks, *this Towmotor Pace-Maker has it!* Mass-handling miracles seem to happen every minute it's on the job. Its hydraulic muscles hustle heavy loads through storage, production and shipping with a real promise of extra profits *around the calendar.*

Let us send you latest on-the-job facts applying to your specific type of factory, mill or warehouse operation. Ask for Certified Job Studies relating to your own business—and the new *Pace-Maker* Booklet SP-23. Write *Towmotor Corporation, Cleveland 10, Ohio.*

TOWMOTOR®
THE ONE-MAN-GANG

-GERLINGER

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

zero plus

. . . and Carlson special stainless steels withstand the extremes of another launching

WHEN this missile "lifts off," Carlson special stainless steel plates help launch it into space. These plates are the high strength, precipitation-hardening grades. And there are sound reasons why these grades are used.

First, with Armco 17-4PH, 17-7PH and PH15-7 Mo* it is easier to attain the high physical properties and resistance to elevated temperatures required in space flight engineering. Simplified low temperature heat treatment will develop a Rockwell hardness of C40 to C50. Tensile strengths, so vital in missile components, range from 180,000 to 220,000 psi in plates.

Second, only Carlson produces these Armco grades in the heavier plate thicknesses. For applications where high strength at high temperatures and ease of fabrication are important, get plates in these grades from Carlson. We will be glad to work with you on specific applications.

*17-4PH, 17-7PH and PH15-7 Mo are trade marks of Armco Steel Corporation

G.O.CARLSON Inc.

Stainless Steels Exclusively

122 Marshalton Road
THORNDALE, PENNSYLVANIA
District Sales Offices in Principal Cities

PLATES • PLATE PRODUCTS • HEADS • RINGS • CIRCLES
FLANGES • FORGINGS • BARS and SHEETS (No. 1 Finish)

Photo of Atlas missile courtesy
CONVAIR ASTRONAUTICS,
A Division of General Dynamics Corp.

SHORT TOOL LIFE due to chip weld, cratering and burning, in many cases, has been traced directly to lube oil dilution of cutting oil effectiveness. Cleartex can end this problem forever.

It happens in 7 out of 10 automatics!

Diluted cutting oil shortens tool life drastically

Lubricating oil is probably leaking into the cutting oil sumps of your automatic screw machines as you read this. Current research proves that this is happening in 70% of all the automatics in use today! And where it happens, it shortens tool life by as much as 50%—even 70%. On top of this, the cost of extra regrinds, lost production during tool changes, and excessive scrap production is putting a premium on screw machine operation in too many shops.

Look for these symptoms. One sure sign of dilution is the need for frequent refilling of the lube oil sump. If you are using an ordinary lube oil, this dilution will create two additional—and more costly—symptoms: excessive scrap production and frequent regrinds. Now you can eliminate these forever with the

TEXACO CLEARTEX CURE

The exceptional chemical stability and load-carrying ability of Texaco's Cleartex series make them equally suitable for use as cutting oils, lubricants or hydraulic fluids. All you have to do is use them for both cutting *and* lubrication. With Cleartex in *all* your sumps, you'll find cutting oil dilution will stop and screw machine production cost will drop substantially.

Write today for your copy of Texaco's helpful new booklet "Cleartex in Automatic Screw Machines"...and contact your local Texaco Lubrication Engineer for an authoritative survey of your automatics. Just call the nearest of the more than 2,000 Texaco Distributing Plants, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y. Dept. S-FM-20.

TUNE IN... Metropolitan Opera Radio Broadcasts Every Saturday Afternoon

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

die blocks

For the production of ferrous and non-ferrous forgings in drop hammers, forging presses, and forging machines, we supply five types of pre-hardened, ready-to-use die blocks, inserts, and tools in SPECIAL MACHINING QUALITY that is commercially machinable *as hard as 477 BHN* with modern, high-speed or carbon tools.

FX—die blocks, inserts and tools for an unusually wide variety of hot work applications, both ferrous and non-ferrous, where reasonable first cost and large volume production is important.

DURODI—die blocks, inserts and tools for a wide variety of closed die-forgings made on forging presses, hammers and machines, involving unusual heat and abrasion problems.

CUPRODIE—die blocks for drop hammer and forging press applications, especially for light and medium weight forgings where long runs and high resistance to heat and abrasion are required.

SHELLEX—die blocks, inserts and tools for long run, close tolerance applications on forging presses, hammers and machines, requiring resistance to impact, shock, and sudden temperature change.

W4X—Inserts, tools and die blocks for close tolerance, long production runs of extrusion and forging presses, forging machines, and hammers.

forgings

"Forgings by Finkl" is synonomous with highest quality because our chromium-nickel-molybdenum heavy-duty forgings have the strength, stamina, and fatigue resistance to withstand the severe stresses and torsional strains encountered in modern heavy-duty machinery.

In addition to our CNM forgings, we are able to furnish forged products of AISI carbon and alloy steels, or many special analyses in the smooth forged, rough- or finish-machined condition.

Among the many specialties we have produced from our MO-LYB-DIE processed alloys are:

- Repair parts for all types of forging equipment
- Containers, liners, and plungers for extrusion presses
- Crankshafts for trimming presses, punch presses, mechanical forming presses, nail machines, engines, and pumps
- Gear and pinion shafts
- Plastic mold, and die casting die blocks
- Cylinders

electric furnace steels

Finkl is one of the few heavy forge plants in the United States to operate its own electric melt shop. This modern, fully equipped shop makes possible not only better control of steel quality, but also more precise production planning of all operations. Since each heat is melted and processed to meet a specific order or application, we can give individual attention to the particular requirements of each customer, thus assuring the best forging for your job.

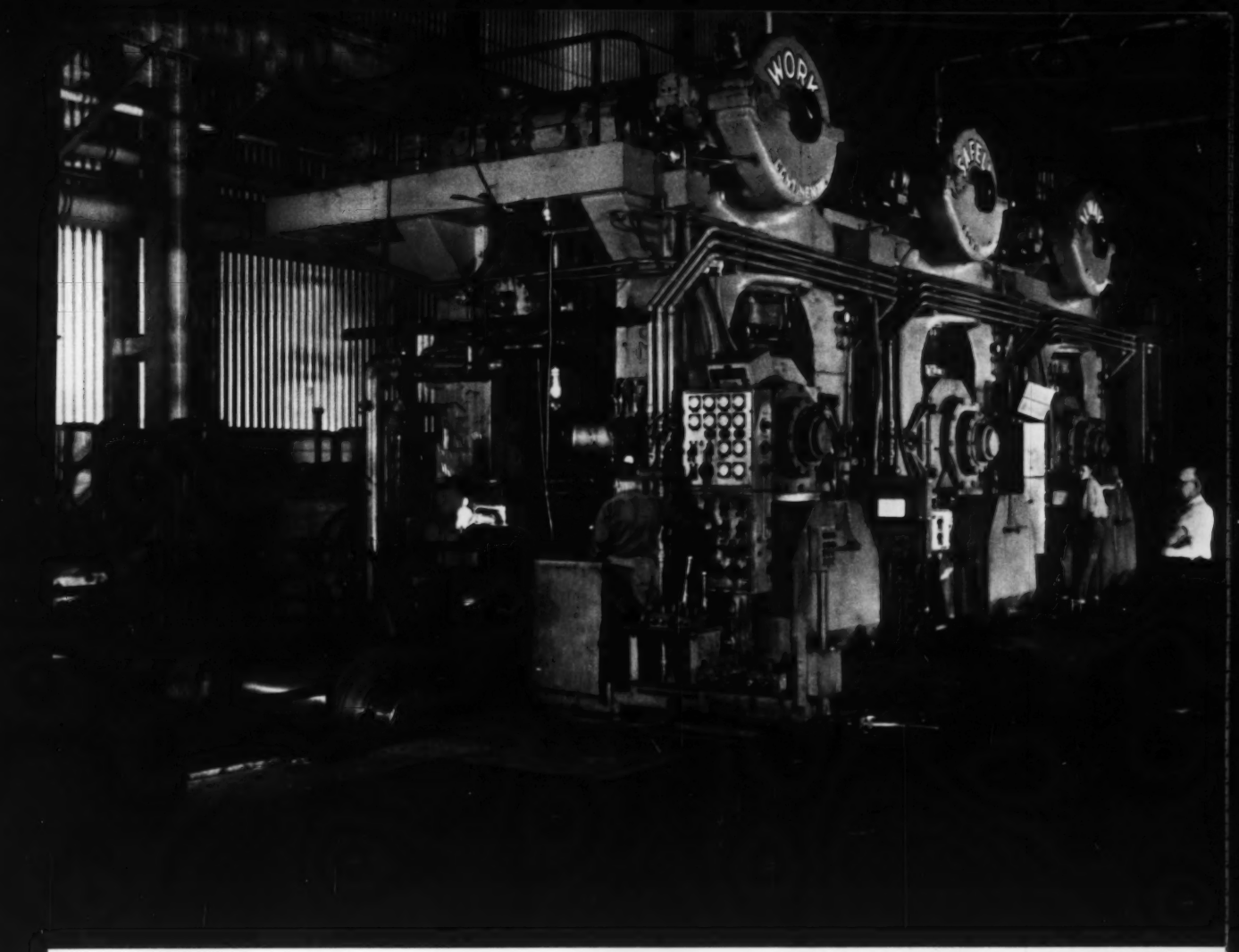
DIE BLOCKS · FORGINGS · HOT WORK STEELS · ELECTRIC FURNACE STEELS

A. Finkl & Sons Co.

2011 SOUTHPORT AVE · CHICAGO 14, ILLINOIS

Offices in: DETROIT · CLEVELAND · PITTSBURGH · INDIANAPOLIS · HOUSTON · ALLENTOWN · ST. PAUL
COLORADO SPRINGS · SAN FRANCISCO · SEATTLE · BIRMINGHAM · KANSAS CITY · BOSTON · LOS ANGELES

Warehouses in: CHICAGO · DETROIT · BOSTON · LOS ANGELES



42-inch, 3-stand tandem cold reduction mill.

BLAW-KNOX
COLD STRIP MILLS

Blaw-Knox designs and builds all types of cold reduction and temper pass mills for ferrous and non-ferrous work. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron and steel rolls, Blaw-Knox Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

BLAW-KNOX

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building · 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

STRUCTURAL SHOP COMPLETELY COVERED WITH **TRANSFER CRANES**

... Eliminate Lost Time Waiting for Crane Service

... Enable Direct Fast Delivery Between Any Points in Shop

... Hoist Carriers Can Be Used Together or Separately in Accordance With Load Requirements

In this area are six motor driven 5 ton, 38′ 0″ span transfer cranes on two runways. Any crane on one runway may be interlocked with any crane on the other runway, permitting a hoist carrier to transfer from one to the other. Not only does this permit direct delivery of loads between any two points in the shop, it allows two hoist carriers on one crane to support both ends of a long truss when desired.

Along the wall at left three two ton, 12′ 0″ span hand propelled cranes with electric hoists handle beams in and out of a punching machine and spacing table.

A BIG factor in the rapid growth of Standard Iron & Steel Works, Limited, Toronto, Canada, is acknowledged to be their wide use of Cleveland Tramrail transfer cranes. This equipment makes possible a highly efficient operation, greatly speeds production and cuts costs.

Cleveland Tramrail equipment has been used at Standard Iron from their early days in the fabricating business. As the company has expanded, more Tramrail has been added. Today Standard Iron is one of the foremost companies in the Toronto area in the design, fabrication and erection of structural steel for buildings and bridges.

For live, aggressive companies like Standard Iron & Steel Works, Limited, Cleveland Tramrail has much to offer. It provides real help in the struggle with rapidly rising production costs. A nearby sales engineer will gladly give you details.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7817 E. 290 ST. • WICKLIFFE, OHIO

You don't ~~have~~ to see the "Red End" to know it's a

SIMONDS

HACKSAW BLADE

Just put it to work ... that's all!

Performance speaks for itself. And if you think there's no difference in hacksaw blades, try this:

TEST 1 BOX OF 10 SIMONDS "RED END" BLADES AGAINST ANY 10 OTHERS

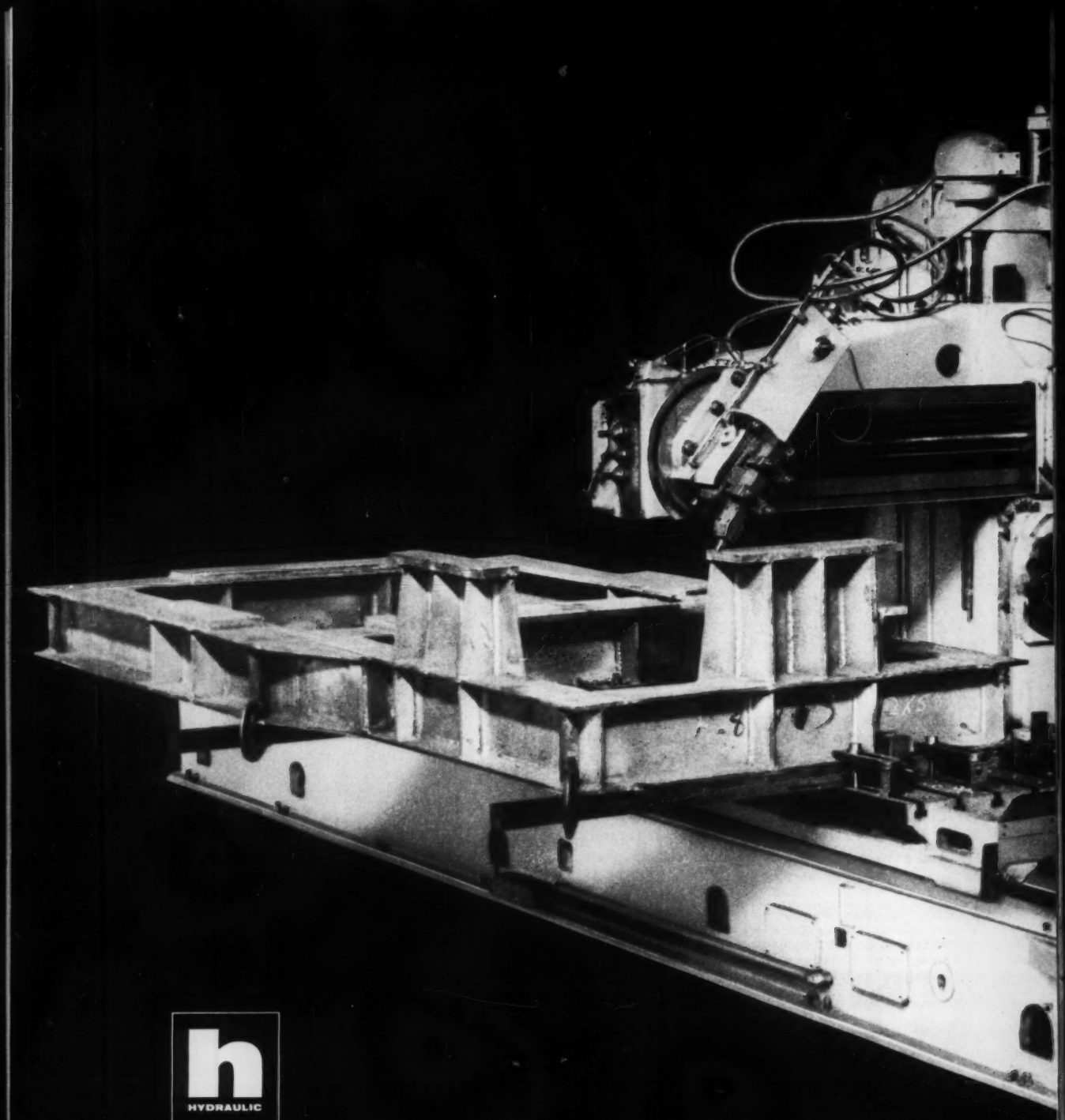
Then you'll know you're getting more for your hacksaw dollar than you ever got before. And then you'll see why so many other hacksaw users "Say Simonds and Save!"

Simonds "Red End" Power Blades come in All-Hard and Shatterproof types in all standard lengths, thicknesses and tooth spacings . . . a "right" blade for every job! Three types of Hand Blades are also furnished in all standard specifications for best results at lowest cost.

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.

Factory Branches in Boston, Chicago, Shreveport, La., San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y., Heller Tool Co., Newcomerstown, Ohio
Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

For Fast Service from Complete Stocks
Call your
SIMONDS Industrial Supply DISTRIBUTOR

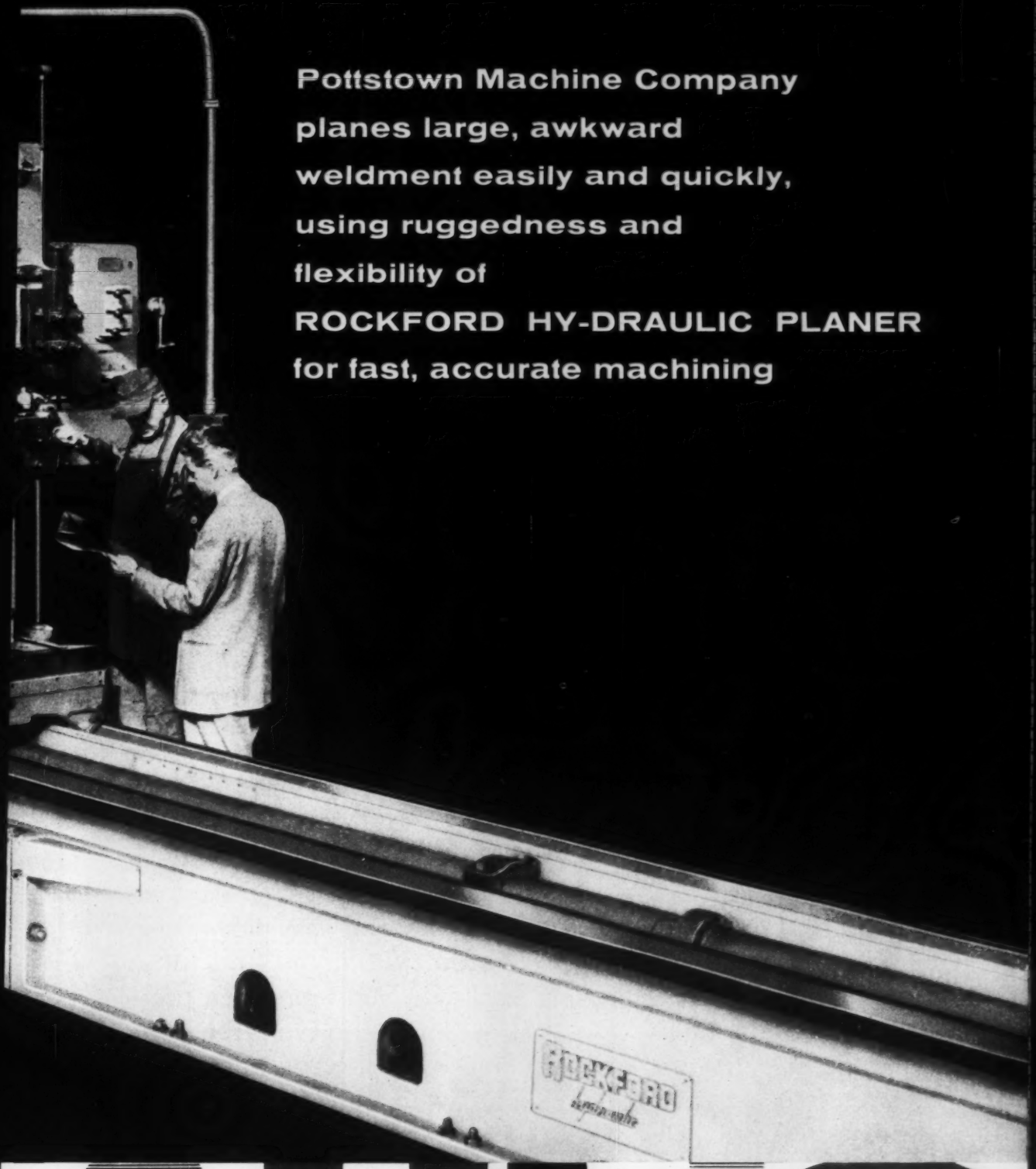


HYDRAULIC

ROCKFORD MACHINE TOOL CO. 2500 KISHWAUKEE STREET ROCKFORD, ILLINOIS

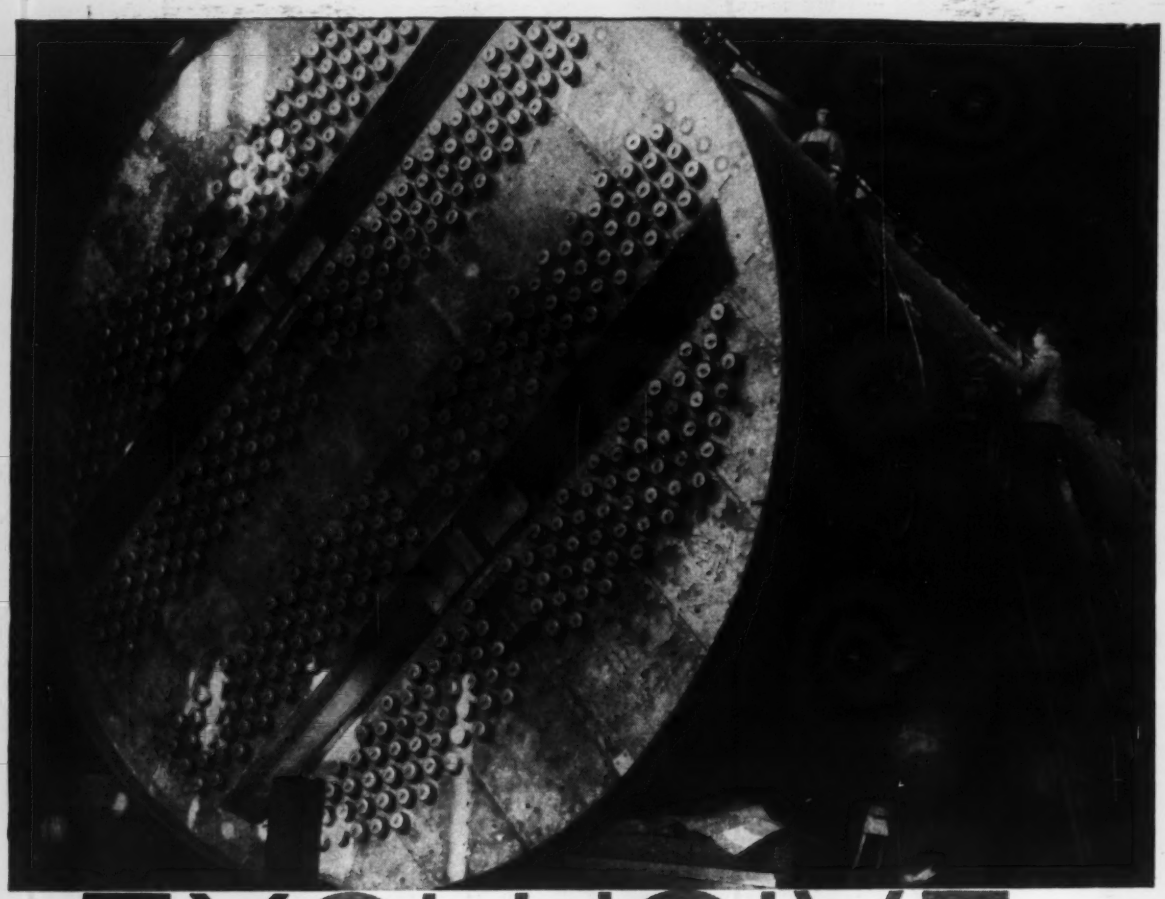
HY-DR

THIS HANGOVER IS NOT A HEADACHE!



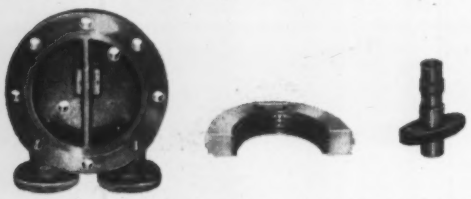
Pottstown Machine Company
planes large, awkward
weldment easily and quickly,
using ruggedness and
flexibility of
ROCKFORD HY-DRAULIC PLANER
for fast, accurate machining

AULIC



EXCLUSIVE...

At Sun Ship, STAINLESS STEEL is synonymous with EXCLUSIVE, because Stainless is never exposed to contamination by fabrication with ordinary carbon steel tools.



Working with the 300 to 400 series of alloys, clad steel, aluminum and other alloys, Sun fabricates pressure vessels, tanks, towers, troughs, autoclaves, reactors, hoppers, platework and machinery in all sizes and types. Each to exact specifications. Each with an additional quality feature... EXCLUSIVE.

SUN SHIP

BUILDING & DRY DOCK CO.
CHESTER, PENNSYLVANIA

Stuart

Productive Lubrication

FOR PROFIT-MINDED PRODUCTION MEN

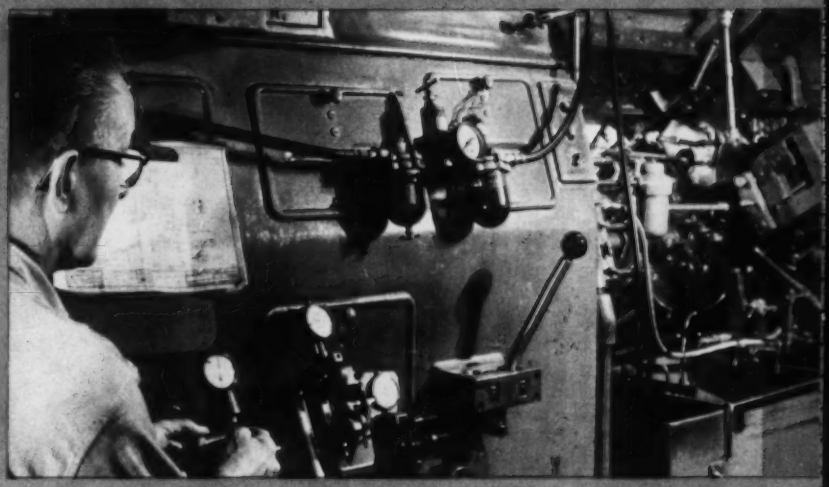
VOL. 1, NO. 1 FEBRUARY, 1959

You don't need a lot of different cutting fluids to get the best plant wide tool lubrication

Stuart's ThredKut proves versatility as line oil at Chicago Screw Company

Selection of cutting fluids for constantly changing, diversified machining operations can be a thorny problem. This company, largest of Standard Screw Company's six divisions, met it head-on by making quality and cost the deciding factors. The Chicago Screw Company is one of the world's largest producers of both special screw machine and hot and cold upset products — plus Standard's broad line of Stanscrew Fasteners — and uses a central system for supplying coolants to more than 1,700 machines at its Bellwood, Illinois plant covering an area of over 628,000 sq. ft.

Stuart's ThredKut base at 8:1 is used as a line oil and meets the requirements for most operations. Chicago Screw's central system



Tool life and finish are important factors in machining this special hex head dog point fastener of C-1141 steel. This precision part is made complete on the Acme-Gridley screw machine and operations include forming, sizing, and thread rolling.

Straight ThredKut 99 is used on this Cincinnati Filmatic centerless grinder to grind four diameters in one pass. The part is a special socket head crankshaft screw of alloy steel. An aluminum oxide wheel is diamond dressed by means of a profile cam to produce the desired contours.

delivers this oil to various departments where, if richer or leaner mixtures are required, these changes are quickly made for individual machines. Screw stock may be machined with 12:1 or 15:1 dilutions, whereas form grinding is usually done with a full concentration of ThredKut 99.

This progressive program has also proved profitable since the company maintains tight control over one of the most vital machining variables affecting tool life, finish, and profit. Many manufacturers not having Chicago Screw's 86 years experience have found themselves catering to operator "whims" or departmental preferences by buying or blending a wide variety of water-mix and straight-oil compounds. This practice can often lead to confusion, waste, and hidden costs.

In a nutshell, the screw machine industry is far too competitive for this leader not to have an intelligent plant lubrication policy. When turning out work on a $50,000 machine, Chicago Screw has found it is false economy to select coolants that will not provide maximum productivity at lowest per-unit cost.

By using ThredKut, this manufacturer retains complete flexibility for solving a large percentage of its lubricating problems. In handling free-machining materials, for example, ThredKut is used at 15:1 with paraffin oil. In machining tough stainless, a rich 4:1 mixture is indicated. ThredKut's versatility is further demonstrated by the internal broaching of 1018 steel crankshaft couplings ½" in diameter. Fluid film lubrication at the tool-chip interface reduces friction and heat; proper concentration of active sulphur prevents chip welding and eliminates rough surface finish problems.

MORE PL FACTS ▶

Productive Lubrication

New hot die lubricant solves sticking problem

Stuart's Thermex 33 proved to be the ideal "boundary lubricant" for tough forging operations at J. H. Williams & Co., because it prevented metal-to-metal contact, provided maximum plasticity of metal, and eliminated sticking. The result was lower scrap losses, increased production, and longer die life.

Spray of Thermex 33 is electronically metered to the dies between strokes of 3000-ton press. Minimum flash and smoke are important operator benefits.

Thermex 33 was developed for hot forging where heat and pressure are too severe for ordinary lubricants. Quality-controlled graphite is used to provide solid lubrication which resists high temperatures. An extreme pressure additive prevents metal seizure and welding.

SAE 1045 steel blanks are formed into double-flanged roller rims for tractors in a three-stroke 22-sec. operation.

General-purpose lubricant jumps production 200%, belt life 25%..grinding stainless to #4 finish

Belt life was increased 25% by changing to Stuart's ThredKut 99, which is used with belts ranging from 50 grit for roughing to 120 and 150 grit for finishing. Reduction in downtime for belt changing alone uncovered important hidden savings.

Stuart's ThredKut 99 grinding and polishing oil replaced a complex three-oil system which limited production of stainless sheet at Atlas Steels Limited, Welland, Ontario.

This Canadian steel company consistently produces a No. 4 finish on as many as 150 tons of stainless sheet per month on two Mattison abrasive belt grinding and polishing machines, using Stuart's ThredKut 99 as a general-purpose lubricant on all four stages of the grinding cycle.

The combination of high chemical activity for free cutting of tough stainless with extra lubricity provided in ThredKut 99 for production of excellent surface finishes is an important consideration at Atlas. Good scratch pattern and uniform surface finish permit perfect matching of stainless panels placed side by side in construction or assembly.

Production in the roughing operation quickly doubled. ThredKut 99 offered the precise qualities needed for roughing, intermediate grinding, finishing, and polishing to a No. 4 finish. The 25% increase in belt life alone means important reductions in both machine downtime and belt inventory costs. And, one oil instead of three eliminates the possibility of operator mistakes and spoilage.

Considerably fewer flash fires have been experienced during the four years this grinding and polishing oil has been used on the job, with cutting speeds averaging 3600 sfpm. This is due not only to ThredKut 99's higher flash point, but mainly to the fact that less heat is being generated under the positive, free-cutting action of ThredKut 99. ThredKut 99 has a viscosity of 190 sec. at 100°F., assuring excellent belt penetration and thorough "wetting" of the grains.

Stuart's ThredKut 99 is easily applied to the work with a soft bristle brush. Formerly, three special oils were used in four different steps of the grinding and polishing process.

METALWORKING LUBRICANTS

D. A. STUART OIL CO., LIMITED

2727 South Troy Street, Chicago 23, Illinois

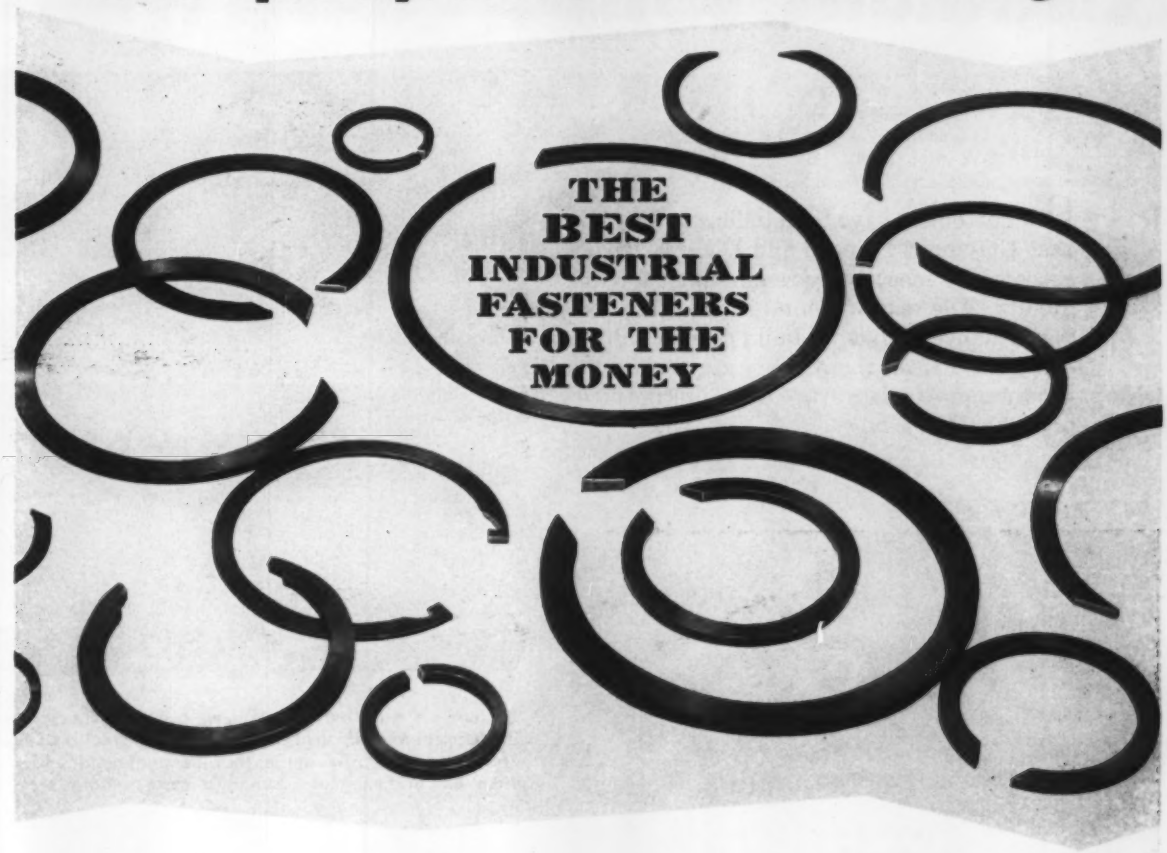
CANADIAN D. A. STUART OIL CO., LIMITED
P. O. Box 430, 43 Upton Road, Scarborough, Ontario, Canada

EUROPEAN OFFICE
BERN, SWITZERLAND, Wale v. Muhlenen, Effingerstrasse 75

Phone Your Stuart Service Center

BAYONNE, N. J. HEmlock 7-0151
HARTFORD, CONN. JAckson 7-1144
DETROIT, MICH. TYler 7-8500
CLEVELAND, OHIO PRospect 1-7411
CHICAGO, ILL. Bishop 7-7100
TORONTO (Scarborough) PLymouth 7-3227

Holding parts in place is a snap with quality EATON-RELIANCE rings



For faster, more secure assembly of your products —with savings that will help you hold the line against rising costs—use quality snap, bearing, lock and retainer rings by Eaton-Reliance. You'll cut the cost of fabricating the parts of your product, too, because these versatile rings of a million uses reduce machining costs and simplify the design of individual parts. You can use Eaton-Reliance Rings as heat-treated shoulders on shafts and in counterbores to support bearings and other parts—with substantial savings in machining time, dead metal and final assembly.

Eaton-Reliance Rings, manufactured on precision machines, are made of spring-quality steel, cold drawn in our own plant, and heat treated for the right measure of tension. End cuts and cross-sections are made to your exact requirements. From start to finish, we control every detail to assure you the highest quality rings which can literally hold your products together.

Without obligation to you an Eaton-Reliance fastener engineer will gladly study your product to show you how these versatile rings can cut its cost. Write for the name of the nearest representative, or send for Engineering Bulletin No. 55.

EATON

RELIANCE DIVISION

MANUFACTURING COMPANY

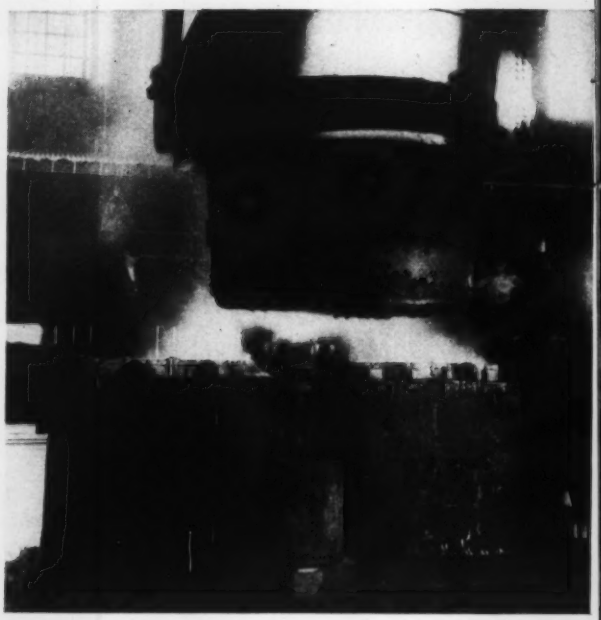
514 CHARLES AVENUE • MASSILLON, OHIO

SALES OFFICES: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Los Angeles

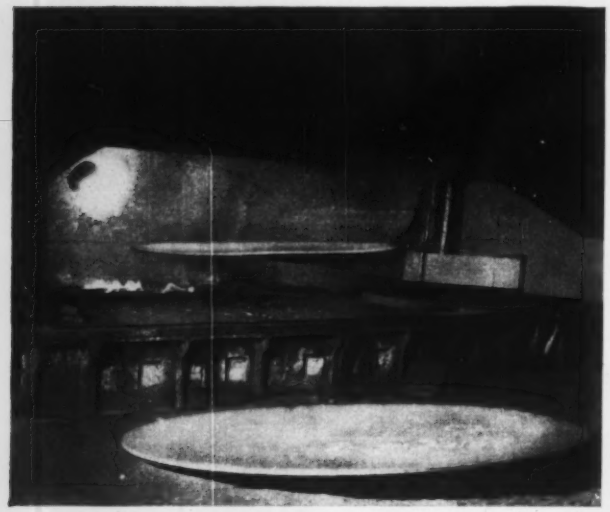
PRODUCTS: Engine Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Hydraulic Pumps Motor Truck Axles • Permanent Mold Gray Iron Castings • Forgings • Heater-Defroster Units • Automotive Air Conditioners Fastening Devices • Cold Drawn Steel • Stampings • Gears • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

step by step...
CLAYMONT BUILDS QUALITY INTO

Our customers have been telling us for years that Claymont Flanged and Dished Heads successfully meet every requirement for top quality. The reason behind such high performance is that we build quality into every head throughout every stage of production—from raw materials to finished product. Here's how:



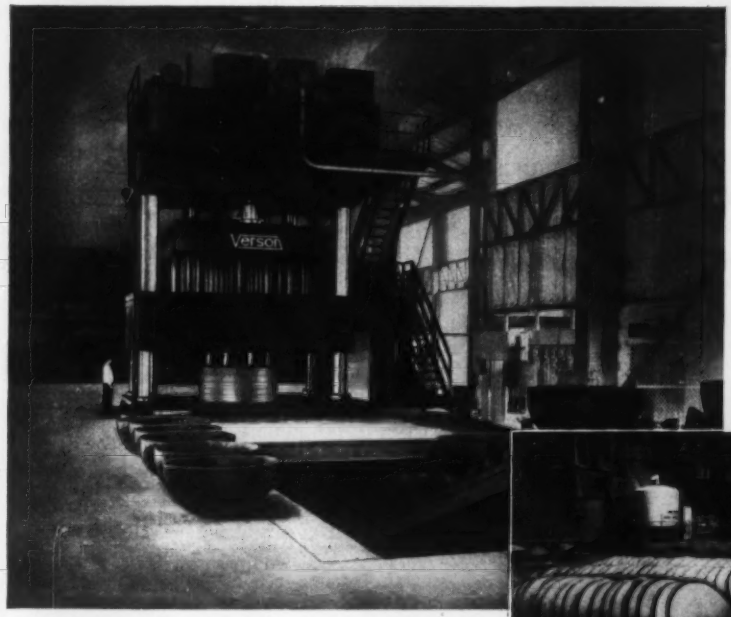
Because we make our own steel, we can carefully control its chemical and physical properties. Here, steel is being "bottom-poured". This means that the ingot mold is filled from the bottom, thus assuring a more uniform steel.



After rolling the ingots into plate, steel circles are sheared to exact size and then heated in huge furnaces like this to the proper temperature for spinning.

This highly skilled craftsman is operating a big spinning machine which produces heads up to 19 feet in diameter. Every head he makes is subjected to careful inspections, both during and after forming.

ITS FLANGED AND DISHED HEADS



Claymont's head pressing facilities include this new 3000-ton giant, capable of hot or cold forming large diameter heads up to 10 feet. With this modern equipment, Claymont can press steel heads that will meet your most exacting specifications.

Stock Heads—You can be sure of quick delivery when you order from Claymont. That's because CF&I maintains large stocks of popular size heads, as well as many types of fittings for tanks and pressure vessels, at these warehouses: Los Angeles, Tulsa, Houston, New Orleans, Chicago, Buffalo and Claymont, Delaware.

and don't forget these other important members of the Claymont family...

- **Alloy Steel Plates**
- **Stainless-Clad Plates**
- **CF&I Lectro-Clad Nickel Plated Steel Plates**
- **Fabricated Steel Parts**
- **Large Diameter Welded Steel Pipe**

Like our heads, all Claymont products have quality built in—by just such painstaking controls and tests during every step of manufacture. For complete information on any Claymont product, contact our nearest sales office or write direct to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P.O. Box 1951, Wilmington, Delaware.

4223

CF&I

Claymont Steel Products

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland (Ore.) • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Tulsa • Wichita

CF&I OFFICES IN CANADA: Montreal • Toronto • CANADIAN REPRESENTATIVES AT: Edmonton • Calgary • Vancouver • Winnipeg

WEIRTON FURNACE SETS RECORD

585.9 tons of steel in just five hours and 35 minutes, an average of 104.9 tons per hour, tap-to-tap! That's the new world's record for steel production established by Weirton Steel's No. 1 open hearth furnace—on a RAMICLASE bottom. Previous record—79.6 tons per hour—was held by Weirton's No. 14, world's largest open hearth, which has a RAMSET bottom.

In selecting any Basic refractory, you are assured of a proven product backed by the most modern methods of manufacture and quality control . . . plus 50 years of continued service to the Steel Industry.

Photograph by Charles Carr, Jr.

BASIC INCORPORATED

CLEVELAND 15, OHIO

9 of 10 Steel Buyers Building Stocks as Strike Hedge

Purchasing agents, people who have to put money on the line in betting about steel strike possibilities, are almost unanimously wagering that we'll see a walkout this summer (Page 93). Some 96 per cent of 200 queried by STEEL think we'll have one, and 90 per cent of the 200 plan to build inventories by July 1 as a hedge against curtailed steel production and higher prices. Says one of the few who predict no strike: "Steel stocks will be so high by July 1 that most users of the metal won't suffer unless a walkout would last longer than eight weeks. The union will be in such position that it won't dare strike."

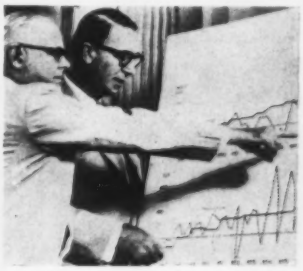
Labor News Notes

President Walter Reuther of the United Auto Workers is calling on Congress to legislate a shorter workweek as a step toward full employment, increased purchasing power. UAW itself has made a second reduction in its staff personnel, voted a second short term pay cut. Reason: Union membership has dropped 200,000 in the last year and a half . . . IAM Research Director Carl Huhndorff says that more than 263,560 machinists will receive pay raises from 800 U. S. and Canadian industries as part of two and three year contracts written in 1957 and 1958.

Rails Lease More Equipment

Lack of investment capital is causing more railroads to turn to leasing. The Baltimore & Ohio Railroad just signed a $4.6 million lease with Morrison Plan Inc., Buffalo, involving 1300 pieces of equipment. Included are 400 trucks, with flanged wheels to operate on road or rail, for track maintenance.

Antitrusters Stirring Against Autos, Steel



Where there's smoke, there's fire. But how much fire? That's the question facing the steel industry concerning reported grand jury investigations of alleged monopoly. Smoke was so plentiful last week that facts were almost covered by rumor. The major fact: Lyle Jones, chief of the San Francisco office of Justice's Antitrust Division, says a federal grand jury will begin an investigation in April of "possible price fixing and channelization" of steel trade on the West Coast. About 30 steel firms with western operations

may be subpoenaed. The major rumor: U. S. Steel Corp. will be investigated by a federal grand jury in New York, similar to the current study of General Motors Corp. (Page 100). U. S. Steel Corp. says it hasn't been contacted by the government in any way on this matter.

Mitchell Opens Door for Kennedy Bill

Labor Secretary James P. Mitchell, the administration's watchdog over labor legislation, has indicated he will not oppose the Kennedy-Ervin labor reform bill if Congress will guarantee action on a second bill soon. Mr. Mitchell considers any bill a "half-measure" if it does not contain tighter controls over secondary boycotts and coercive picketing—also the view of employers. The secretary implied he would be satisfied with a commitment by Senate Majority Leader Lyndon Johnson that the Senate would have the opportunity to consider a second piece of legislation. It would contain the union-sought Taft-Hartley amendments, as well as the picketing and boycott amendments which Senator Kennedy and the unions view as too harsh.

Was Air Force Justified in Its Choice?

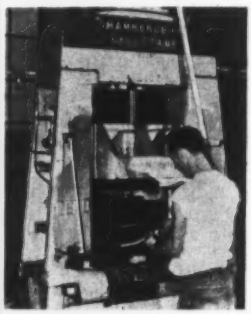
Rep. Chet Holifield's (D., Calif.) Military Operations Subcommittee, created to study the armed services' missile procurement techniques, has heard witnesses from the Air Force, Space Technology Labs, and Thompson Ramo Wooldridge Inc. The question: Is it best to have one firm do all the systems engineering and technical direction for a multibillion dollar program like ballistic missiles, or should the sponsoring service retain more control? The Army and Navy will state their points of view soon (Page 98).

State May Guarantee Business Loans

Michigan Gov. G. Mennen Williams proposes an industrial FHA program to promote business in his debt-ridden state. The governor seeks a constitutional amendment this spring which will permit the state to guarantee loans for manufacturing projects and industrial research up to a total of $100 million at any one time. Individual loans could not exceed $1 million, or finance more than 90 per cent of the project's cost.

Restriking Cuts Cost of Malleable Castings

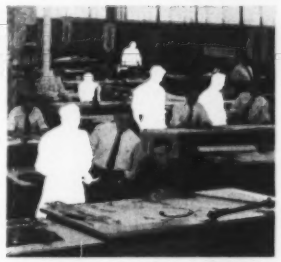
You may be able to trim the cost of processing malleable iron castings and get closer tolerances by restriking them. Four foundries have run production jobs; they report they can eliminate hand straightening, cut down on subsequent machining, and in some cases reduce the weight of castings. The parts (Page 152) cover a wide range of shapes and sizes. Tooling cost is also relatively cheap. One company reports an average die set costs $80 to $90. It has more than 200 sets in production.



Electronic Device Sales To Reach New Highs

Sales of transistors and other solid state electronic devices will grow by 30 per cent this year, reaching a record $255 million, predicts H. B. Fancher, general manager of General Electric Co.'s Semiconductor Products Dept. Affected only slightly by the recession, sales of transistors, rectifiers, and diodes rose 35 per cent last year, setting a new high of $195 million. Mr. Fancher says that, of the total market, rectifier sales will be about $50 million; transistors will grow to a $140 million level, and diodes will account for $65 million.

How To Cope with Future Talent Shortage



You're liable to be hurting for creative engineering talent by the early 1960s unless you begin now to build the kind of corporate climate that will attract topnotch personnel and bring out the best in your staff. Technical manpower consultants say that, with a demand for 46,000 engineers annually through 1961, colleges will hand out a peak of only 43,000 engineering diplomas per year. The long term solution: Don't stifle the individual with "teamwork"; give appropriate rewards when and where they're due (Page 108).

Road Building To Hit Record $6 Billion

Road building to the tune of $6 billion will make 1959 the "biggest highway year in history," says Maj. Gen. Louis W. Prentiss (ret.), vice president of the American Road Builders Association. The Federal Interstate Highway System will account for about $2.3 billion. General Prentiss warns that Congress must act this year to avoid a major interruption in 1961 of work on the 41,000 mile interstate highway system, pointing out that construction costs have jumped 37 per cent since the program was authorized in 1956.

Here's a Big, New Area for Metalworking

Note to diversifiers: Don't overlook your chances in the electrical components field. There's a lot of potential here for metalworking, much of it in work that most shops can do today. STEEL takes you into the new Westinghouse plant at Bloomington, Ind., for a look at some typical electrical manufacturing that's just plain metalworking. Case in point: A Westinghouse transformer housing which is just what the industry is looking for. It's made of aluminum extrusions (Page 148).

India's Steel Capacity Rises in Cold-War Contest

Steelmaking capacity is creeping upward in neutralist India as Russian and western interests race to complete new steel producing facilities. India's

President Rajendra Prasad recently inaugurated blast furnace operations at two new plants. One was built by the Russians at Bhilai with 1 million ingot ton capacity, the other by West German companies at Rourkela with another 1 million ton potential. Capacity has been doubled at Tata Iron & Steel Co. Ltd., Jamshedpur, a project directed by Kaiser Engineers International and financed by World Bank loans. Another plant with 1 million ton capacity is being built at Durgapur by a group of major British firms. Steel consumption in India goes into such new products as industrial sewing machines, concrete vibrators, gear cutters, locomotive boiler tubes, and inboard and outboard boat motors.

Wire Clothmakers Losing Foreign and Domestic Markets

Wire cloth producers tell STEEL they're expecting better business in 1959. Their product is found in hundreds of applications, including many in your plant. But foreign competion is prompting U. S. producers to abandon the manufacture of fine mesh cloth. Tariffs are not high enough, say domestic producers, and there are no foreign markets in which U. S. makers aren't hopelessly undersold. The usual reason is behind it: High U. S. labor costs (Page 191).

Nationalization Hot Issue in British Election

Look for further nationalization of industry, including steel, to become the major political issue between the Tory and Labor parties in the next British general election. Balloting may be held this spring, or it may be delayed for a year. If victorious, Labor is committed to restore public ownership of the steel and long distance trucking industries. Conservatives are banking on results of a public opinion survey showing a vast majority of Britons interviewed to be opposed to extension of state ownership. Of the Labor voters polled, 30 per cent were against further nationalization; 10 per cent favored reduction of public holdings. The survey, conducted by the British Market Research Bureau, was backed by more than 200 companies using or making steel.

Straws in the Wind

Price reductions on six types of Raytheon Mfg. Co.'s transistors are announced by Harvey J. Finison, manager of Raytheon's Semiconductor Div. . . . Whole-house cooling systems will be within reach of more families in 1959, says the Gas Appliance Manufacturers Association. Reasons: Stable prices, easier financing, improved insulation in new homes . . . Space Age demands will increase the number of astronomers in the U. S. (now 800) fourfold in the next ten years, predicts University of Michigan Prof. Leo Goldberg . . . The U. S. aviation industry has invested $750 million to $1 billion in the jet transport program, says A. E. Raymond, senior vice-president, engineering, Douglas Aircraft Co. Inc. Douglas has put $250 million in its DC-8 development.

NOW...AT INLAND...500,000 ADDITIONAL TONS CAPACITY FOR COLD ROLLED SHEET PRODUCTS . . . a half-million more tons of the same uniformly dependable steel that has made *Inland Quality* the recognized standard among manufacturers throughout the great Midwest. Inland's giant, new 4-stand tandem mill, most powerful of its size in the industry, is part of Inland's program of expansion, keeping pace with the growth of Midwest manufacture. New pickling, continuous normalizing, annealing and tempering facilities do their part in producing this quality steel for your use. This new capacity means better service for you from Inland.

INLAND STEEL COMPANY

30 W. Monroe St. • Chicago 3, Ill. | *Sales Offices:* Chicago • Milwaukee • St. Paul • Davenport • St. Louis • Kansas City • Indianapolis • Detroit • New York • Houston

INLAND

Other Members of the Inland Family
JOSEPH T. RYERSON & SON, INC.
INLAND STEEL PRODUCTS COMPANY
INLAND STEEL CONTAINER COMPANY*
INLAND LIME & STONE COMPANY*
*Division

This giant microwave tower is fabricated from Armco ZINCGRIP Steel Tubing. It is a product of Alprodco, Inc., Memphis, Tenn.

Husky tower of Armco ZINCGRIP Steel Tubing shrugs off wind loads, resists rust

Every structural member in this 260-foot microwave tower is made from Armco ZINCGRIP® Steel Tubing. Test loads testify to its strength in high winds. Its durable zinc coating assures resistance to rust.

Armco ZINCGRIP Tubing provides this same sturdy strength and corrosion resistance in hundreds of other products—from farm gates, TV masts and playground equipment to carport supports, sign posts and conveyor rolls.

Wherever you need structurals that must resist rust, must remain strong, consider Armco ZINCGRIP Steel Tubing. It's a low-cost solution to problems of tubular design. What's more, it can be readily fabricated without flaking or peeling of its full-weight, hot-dip coating of zinc.

In addition to this zinc-protected grade, Armco produces two durable grades of aluminum-coated tubing. For more information about these cost-saving Armco Coated Tubing grades—why and where they're used—just fill in and mail the coupon.

ARMCO STEEL CORPORATION
1399 Curtis Street, Middletown, Ohio

Please send me a copy of your folder, "Why Designers Specify Armco Coated Tubing."

We make_____

NAME_____

TITLE_____

FIRM_____

STREET_____

CITY_____

ZONE_____ STATE_____

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

Dilemma in Machine Tools!

Not long ago, an American machine tool company with a modern plant, its own foundry, and an excellent engineering staff purchased a machine tool plant in Europe.

Like other machine tool companies, it had to acquire a foreign plant as a matter of self-preservation, to compete for business outside the U. S.

The company found that it could build duplicates of its American-designed machines in its foreign plant and deliver them in the U. S. at savings of 30 per cent.

A tempting expediency suggests itself. The company could fire its engineering staff. It could close its foundry and lay off several hundred skilled machinists. American customers could be served by its plant abroad.

Of course, management has no such thoughts.

But this company pretty much typifies the problems faced by our machine tool industry.

At one time, the industry found strong support in exports amounting to 20 to 25 per cent of production. Today, they are only 10 per cent. As European countries recovered from the devastations of war, they were able to supply their own capital equipment needs and regain their former positions in the world market.

Three European countries, Germany, France, and England, produced about twice as many machine tools as the U. S. did in 1958. A new competitor, the Soviet Union, produced about four times as many.

The American machine tool industry can hardly be blamed for setting up shop in foreign countries to compete for world business. But the drift abroad eventually could have devastating effects on the growth of our economy and the status of our national security.

The solution to the machine tool industry's problems cannot be lifted out of a hat by magic, but solutions must be found.

Here are three approaches:

1. Tie machine tools more closely to the government's foreign assistance program.

2. Determine whether the present import duty (15 per cent) offers adequate protection to domestic builders.

3. Revamp tax depreciation laws immediately so industry can replace over-age machine tools.

Irwin H. Such

EDITOR-IN-CHIEF

Rycut 40 drills cleanly, cuts down on tool wear and breakage.

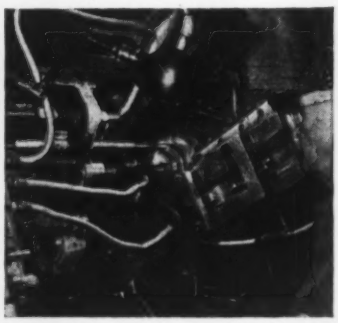
Rycut 40 alloy steel boosts production 30%, tool life 50%

Drilling piston pin bolt heads of AISI 4140 was a costly problem at Hyland Machine Co., Dayton, Ohio.

The job called for cross-drilling two holes in each face of the hex head (see diagram). A Ryerson specialist recommended new Rycut 40, the world's fastest machining alloy steel in its carbon range.

Here are the results, from Partner Forest Hyland: "We have cut down drill breakage. We have 15% fewer rejections. There is a marked improvement in finish, plus a comparable saving shown in milling the head of the bolt. Tool life on the automatic screw machines is 50% longer, total production is up 30%. Now we can produce this bolt at a competitive price."

There is a dependable, cost-cutting steel at Ryerson to meet every requirement. The Ryerson quality controls assure you of getting steel you can count on for dependable performance—every time. Ask your Ryerson specialist for help on your steel problems.



Six-spindle automatic screw machine producing piston pin bolts with cost cutting Rycut 40.

RYERSON CERTIFIED QUALITY

RYERSON STEEL

Member of the INLAND Steel Family

Principal Products: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing—aluminum, industrial plastics, metalworking machinery, etc.

PLANTS AT: NEW YORK • BOSTON • WALLINGFORD • PHILADELPHIA • CHARLOTTE • CINCINNATI • CLEVELAND • DETROIT • PITTSBURGH
BUFFALO • INDIANAPOLIS • CHICAGO • MILWAUKEE • ST. LOUIS • DALLAS • HOUSTON • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

NEA

96% of purchasing men think a steel strike will recur next summer, so . . .

9 of 10 Buyers Rush To Stock Steel

"CRIPES! More trouble."

That's typical of the reaction from 200 purchasing agents queried by STEEL about a possible steel strike and price rise next summer. The Buffalo steel buyer who foresees trouble is among the 96 per cent of purchasers who think we'll have a walkout.

• **Inventories Up**—He's also in the large majority—90 per cent of the respondents—who are building inventories as a hedge against trouble in steel by mid-1959 (see Pages 94-95). Here are samples of common situations leading buyers to boost stocks:

"We have a backlog of orders through September, 1959, for which we must have steel."—Warren, Pa., purchaser.

"We'll increase our inventories by 200 per cent from now until July 1. That's covered by firm authority — mostly automotive."—North Tonawanda, N. Y., buyer.

"Auto demand will lead us to boost inventories by 150 per cent. We'll have so much steel that we expect to use outside warehouse facilities to store excess stocks."—Cleveland agent.

"We're raising inventories only 10 per cent because we have doubts as to the financial advantage of increasing inventory to hedge against price rises. We will attempt to hedge against a strike by balancing our inventory against demand."—Shreveport, La., purchaser.

"We'll increase inventories by one-third to one-half in the next four or five months. The inevitable price rise makes this a good gamble even if the strike doesn't materialize."—Des Moines, Iowa, buyer.

• **Price Rise Expected**—Most steel purchasers expect an eventual price increase. Although they understand why it's coming, they still don't like it. Comments like this are common:

"A price increase of $8 to $10 per ton will force us to consider foreign steel, via the St. Lawrence Seaway."—Salem, Ohio, purchaser.

"If labor and inflation get further out of hand, the government should step in."—Houston buyer.

• **Long Strike?**—Some 51 per cent of the respondents believe a steel strike would last six to eight weeks; 14 per cent think it would last

longer; 35 per cent say it would be shorter.

Some 50 per cent expect to boost stocks by 30 to 90 days. About half of the respondents to STEEL's survey expect a six-to-eight week strike next summer.

• **Auto, Oil Firms Lead**—All kinds of steel consumers are hedging against a steel strike, but automotive and oil firms lead the rush, judging from the survey. The Big Three auto firms are stockbuilding at a leisurely pace, but suppliers are almost frantic in their buildups. Manufacturers of parts are trying to lay in enough metal by July 1 to carry them through initial runs on the 1960 cars. One major supplier is authorized to buy all the steel he will need through October on this schedule: 40 per cent for March delivery, 40 per cent for April, and 20 per cent for June.

A purchaser for a major oil company reports: "We're buying all the steel we'll need through the third quarter, especially line pipe, casing, and tubing." In contrast with the automotive pattern, the major oil companies are leading the rush to buy. Small organizations are much more cautious.

• **Effects of Stockbuilding**—A Ft. Wayne, Ind., buyer thinks that "steel users are forcing a strike by banking ahead." But a Reading, Pa., purchaser, one of the few to predict no strike, analyzes inventory building this way: "Steel stocks will be so high by July 1 that most users of the metal won't suffer unless a walkout would last longer than eight weeks. The union will be in such a poor bargaining position that it won't dare strike."

At least one president of a steel company (a specialty producer) agrees with the gentleman from Reading.

• **Publicized Wage Talks** — Most labor observers agree with the substance of many comments to STEEL's survey: The 1959 steel parleys are the most publicized in industrial relations history. The publicity is influencing the surprising extent of inventory building. Note on Page 95 that 47 per cent of the respondents will boost their steel stocks 26 per cent or more between Feb. 1 and July 1 solely as a hedge against a possible steel strike and price increase.

"In past strikes, consumers hungry for steel have influenced the steel companies to come to quick terms with the union," comments a Utica, N. Y., purchasing agent, who predicts no strike but is building inventories by 20 per cent as a strike hedge. "At the rate we're buying steel, we won't be hungry on July 1. Our influence on steel management thinking will be far less than in many former situations."

A Denver buyer sees no industry-wide strike but a series of wildcats and sporadic walkouts like those in the auto industry last year. "This inventory buildup is leading to conditions that parallel those facing Walter Reuther in 1958. The steelworkers will stall along, working without a contract, hitting the bricks for brief periods, most of the summer maybe. When steel inventories go down, union pressure will go up."

• **Pressure Building Now** — Both steel management and labor are starting to build up the pressure now. One sign of it is the series of newspaper ads each side is running. The United Steelworkers are hinting that their demands would cost $1 billion. That's roughly 50 cents an hour, calculated on the basis of present employment and a 2000 hour year.

Management is presenting statistics to show that the cost of living, as measured by the government's consumer price index, doubled between 1940 and 1958's third quarter, but steelworkers' average hourly earnings increased three and one-half times, and total employment costs per hour worked quadrupled.

• **Timetable** — The pressure will build even more when the United Steelworker executive committee meets (probably in March) to decide on demands and strategy. The wage policy committee will meet in late April amid the blare of publicity to endorse what the executive committee decided earlier. Bargaining will begin in May. The contract expires at midnight, June 30. Thinking among steel company executives is that the contract won't be signed until August. Some say September.

• **The Issues**—As usual, wages will

STEEL checked 200 steel

1. Do you think there will be a steel strike?

YES... say 96 per cent

NO... say 4 per cent

2. How long will it last?

6-8 weeks is the consensus

buyers on these three questions:

3. As a hedge against a possible steel strike, how much higher will your steel stocks be on July 1 than they were on Feb. 1?

In terms of days' operation	In terms of a percentage increase
10 per cent say no increase	10 per cent say no increase
31 per cent say 10-30 days	14 per cent say 1-10 per cent
28 per cent say 30-60 days	29 per cent say 11-25 per cent
22 per cent say 60-90 days	25 per cent say 26-50 per cent
9 per cent say more than 90 days	22 per cent say more than 50 per cent

be the central issue. Steelworkers will set 7 cents as the minimum they'll settle for. That's what autoworkers get next August. The $2-a-day pay boost won by soft coal miners, many of whom work for steel companies, will also put management in a bind. With the new boost, miners earn about 30 cents more per hour than steelworkers. Steel companies will show that the coal settlement is unusual, that the median increase in 1958 for all industry has been about 8 cents an hour.

The steel industry will argue that wage gains should not exceed the improvement in productivity. It will also contend that productivity cannot be measured by manhours alone; capital investment must be taken into account. Steelmen are working with data which show that productivity for all industries is not rising as rapidly as unions claim. Steel management reports a figure of about 3 per cent per year for the last nine years, compared with the Bureau of Labor Statistics' 3.9 per cent, based on manhours alone.

The steel industry also wants to change the cost-of-living provision. It has cost 17 cents since it was first figured for Jan. 1, 1957.

• **Other Demands**—The union will seek changes in job classes and more liberal Supplemental Unemployment Benefits—an extension from 26 to 30 weeks. Health and welfare demands are likely.

Length of contract is a sore point with management. Many feel that three years is too long.

A two year deal is a possibility this time.

• **The Bargainers**—Two new officials will help man the steel industry's bargaining team when negotiations begin in New York City. Heading the negotiators will be R. Conrad Cooper, U. S. Steel Corp.'s executive vice president-personnel services (taking the place of retired John A. Stephens). The other new man will be H. C. Lumb, Republic Steel Corp.'s general counsel. Returning will be R. Heath Larry of U. S. Steel and John Morse of Bethlehem Steel Co. Backing up that group will be executives from nine other steel companies.

Representing the union will be David J. McDonald, USW president; Howard Hague, vice president; and I. W. Abel, secretary-treasurer.

While those committees will do the major bargaining, preliminary and wrapup parleys will be done on a company-by-company basis, with each firm's negotiators meeting with their respective union committees.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Steel Output Climbs

Production of steel in January was at the highest level in 18 months, states the American Iron & Steel Institute. Output of 9,312,000 net tons was just 79,000 tons shy of the previous high mark set in June, 1957. It was 600,000 tons above December's total and 2.5 million tons higher than the January, 1958, production. The operating rate for the month was 74.3 per cent of the Jan. 1, 1959, capacity.

For the first time, the AISI report showed output of steel from basic oxygen furnaces. Production was 187,000 tons, or 2 per cent of the total.

U. S. Steel's R. C. Cooper, chief bargainer for steel, tells . . .

How Wage Inflation Hurts

WORRIED about inflation?

So are the people who will talk contract with steelworkers this year.

The man who will head the steel industry's bargaining team, R. Conrad Cooper, executive vice president of U. S. Steel Corp., points out that employment cost per manhour is rising much faster than any estimate of productivity increases.

• **Invitation to Foreign Steel** — "Prices charged for goods and services have increased, raising the cost of living, shrinking the purchasing power of the dollar, and opening wider the door to foreign competition," Mr. Cooper reports.

He adds that, since 1950, American steelworkers have received more in wage increases than German steelworkers get in total wages. One result of the much higher American wage rate: Some 52 per cent of all barbed wire sold in this country in 1957 was made in foreign countries. In 1951, the proportion was 3 per cent.

"In 1953, imports of woven wire fencing accounted for only 1 per cent of all sales in this country. Four years later, the market had dropped about 15 per cent, but imports had increased tenfold," he adds.

• **No Longer Competitive** — "We are well on the road to becoming noncompetitive with foreign industries," Mr. Cooper believes. "Steel imports rose to near record levels in 1958, despite a sharp decline in the domestic market for steel products. Preliminary figures indicate that 1958 steel imports increased by more than 30 per cent over 1957's, while shipments by domestic steel producers decreased by about 25 per cent.

"Direct exports of steel products from this country hit a postwar low. In the past, the U. S. has exported three to four times as much steel as she imported. In 1958, the ratio dropped to less than 2 to 1."

Look for contract negotiators to fight inflationary wage hikes in this summer's talks with steelworkers. Mr. Cooper points out: "From 1940 through 1957 the total employment cost per manhour at U. S. Steel rose at a rate over 8 per cent per year compounded annually. During this same time, our shipments of steel products per manhour of employment rose 2.4 per cent per year compounded annually."

USW Revives Its Whitecollar Drive

UNITED Steelworkers of America is putting more starch into its whitecollar drive.

Its goal: Organize 100,000 to 125,000 office and technical workers in steel, aluminum, canmaking, and allied industries.

Its approach: ". . . Simply this. We're asking them to join the union," says Howard Hague, USW vice president. This is the year the union hopes to reap results of spadework done in the last two years. "It's time to stop making sociological, psychological, and statistical analyses of the whitecollar worker and go out and sell unions to him," asserts John J. Pastin, director of the USW's Office & Technical Dept.

Its selling points: Union officials indicate they'll try to sell whitecollar workers on these three points: 1. Higher wages. 2. Pay for overtime work. 3. Protection against being displaced by office automation.

The USW claims a membership of 45,000 office and technical workers and 75,000 hourly paid clerical workers. It estimates that office and technical workers represent 18 to 20 per cent of the steel industry's employees who are eligible for union membership. It predicts that group will comprise 33 per cent of the industry's work force by 1970.

World Steel Capacity Up 25% Since '55

RUSSIA and its satellites added 19.8 million net tons to steelmaking capacity, vs. 53.8 million tons added by the Free World between 1955 and 1958, says the American Iron & Steel Institute.

Analysis of United Nations reports by the institute shows that the U. S. increased capacity nearly 14.9 million net tons while Russia added 10.3 million during that period.

World capacity, at nearly 372.5 million net tons in 1958, moved up about 25 per cent from the 1955 level. Russia and China have announced major expansion programs since the UN figures were reported late last year.

• **U. S. Capacity Up**—This year's domestic capacity is enough to provide a record 1681 lb of raw steel for every person in the continental U. S., says the institute. The 147.6 million net tons total amounts to 44 lb per capita more than in 1958.

At the start of this year, steel furnaces were operating in 29 of the 49 states, a two-state growth accounted for by plants opened in Arizona and Florida during 1958.

Of the 29 states, Indiana showed the largest capacity gain last year with an increase exceeding 1.6 million net tons, Pennsylvania was second with 1.5 million added, and California was a close third with nearly 1.4 million. Other large increases included: Illinois, about 837,000 tons; Michigan, 766,000 tons; and Ohio, 745,000 tons.

• **Ten-Year Span** — Pennsylvania's growth exceeded 9.9 million tons and topped that of any other state during the last decade. Ohio was next with a gain of over 9.6 million tons; Indiana added nearly 7.4 million tons; Illinois, slightly more than 4 million tons; Michigan, over 3.8 million tons; Maryland, over 3.6 million tons, and New York, more than 2.9 million tons.

Pittsburgh, Sharon Say No

Sharon Steel Corp., Sharon, Pa., and Pittsburgh Steel Co., Pittsburgh, announced last week that talks on a proposed merger have been terminated.

They said: "It does not appear probable that a satisfactory basis for a merger could be reached." Had the marriage taken place, the consolidated firm would have ranked as the nation's ninth largest steelmaker with a capacity of 3,421,000 net ingot tons.

Houston Firm Asked To Import Hearings

THE U. S. TARIFF Commission has been asked by Rep. Albert Thomas (D., Tex.) to include the Houston area in its inquiry of how much the domestic steel industry is being hurt by imports of nails and galvanized wire and fencing.

Representative Thomas invited officials of Sheffield Div. (Houston) of Armco Steel Corp., to attend the commission's Washington hearings Mar. 3-4.

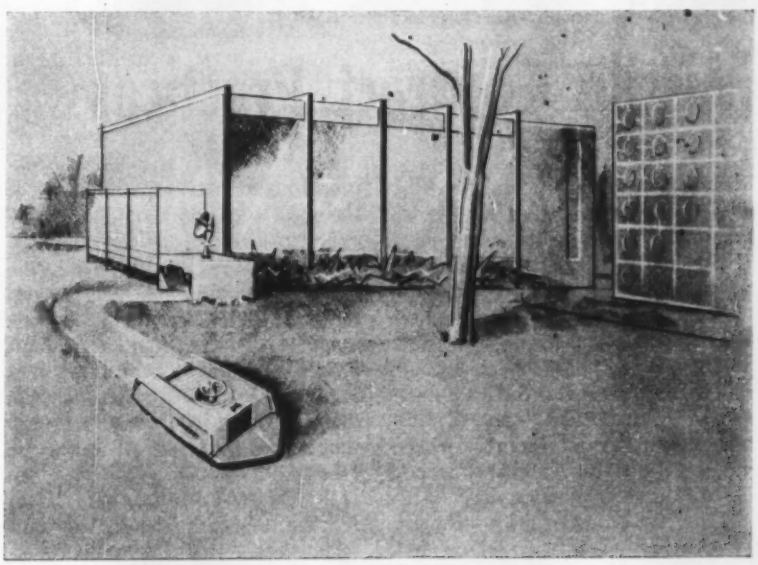
Sheffield said it will answer import situation questionnaires but won't attend the hearings since the Houston mill did not participate in the original applications.

• **Sales Off**—Sheffield said wire sales had slipped nearly two-thirds during the last three years because of wire imports. Shipments of reinforcing bars fell to about 500 tons a month during the last quarter of 1958 (normal volume: 6000 tons per month).

The hearings were instigated by escape clause applications filed Nov. 29 by Atlantic Steel & Wire Co., Atlanta; Keystone Steel & Wire, Peoria, Ill.; Northwestern Steel & Wire Co., Sterling, Ill; and Continental Steel Corp., Kokomo, Ind. The firms claimed their business is being damaged by imports.

• **Deadline May 20** — The Tariff Commission's deadline for a decision is May 20. If it rules in favor of the petitioning firms, recommendations for lower quotas or higher tariffs will be presented to President Eisenhower. The President has 60 days to study the findings and make the final decision.

Foreign mill representatives report January bookings of merchant trade products and a wide range of light materials were satisfactory. As domestic mills become busier, the possibility of increased foreign steel prices grows.



THE LAWN MOWER OF 1969 will be started automatically by an electric eye when the grass reaches a predetermined height, predicts Moto-Mower Inc., Richmond, Ind. The mower will store solar energy for power, follow a precise cutting pattern, adjust to moisture and obstacles, dispose of grass clippings, return to its shelter, and turn itself off without human attention. With adjustment, it will dispense fertilizer and plow snow

REPRESENTATIVE HOLIFIELD
. . . examines missile program

Congress Probes Air Force Missile Contract Practices

MISSILE PROCUREMENT methods of the three services are being analyzed by Rep. Chet Holifield's (D., Calif.) Military Operations Subcommittee. Three days of hearings have been devoted to Ramo-Wooldridge Corp.'s (now Space Technology Laboratories Inc.'s) role in the Air Force's ballistic missile program (Atlas, Thor, Titan, and Minuteman). More hearings are scheduled on the Army's and Navy's buying practices.

Crux: The AF made Ramo-Wooldridge systems engineers for its entire program; the Army and Navy have followed the conventional approach of arsenal development of the big birds—private industry steps in after the basic decisions have been made. Which approach, asks the subcommittee, is the most economical and efficient?

• **Several Motives** — Beneath the surface, the subcommittee is also seriously concerned about charges that Ramo-Wooldridge may have profiteered on its AF business, that it may have pirated scientists from the government's laboratories, and that its control of the AF's program (though its contracts keep it out of hardwarework) may give it too much influence in the choice of associate and first tier subcontractors.

The root of those charges is a General Accounting Office report. (GAO is Uncle Sam's most active fiscal watchdog.) Much of the GAO report came from an AF inspector general's study which was partially released by the AF last year. Doubtless, there have also been complaints (rightly or wrongly) from disgruntled firms doing business with the AF, claiming that Ramo-Wooldridge exerted a good deal of influence in AF circles.

So Congressman Holifield has placed himself in the unenviable position of investigating this nation's heroes of the moment: The men most responsible for our ballistic missile program. In the witness chair so far: James Douglas, AF secretary; Maj. Gen. Bernard Schriever, Ballistic Missile Division commander; Maj. Gen. J. H. Doolittle (USAF, ret.), chairman, Space Technology (who just resigned from the President's space council); Simon Ramo, Thompson Ramo Wooldridge Inc.'s executive vice president; Richard Horner, assistant AF secretary (R&D); and Louis Dunn, Space Technology's president.

A less sympathetic subcommittee chairman than Representative Holifield could have turned these hearing into a three-ring circus. But he has maintained that "no expose" is intended. "We know interservice rivalries exist" on this subject, he said. Throughout the hearings (with Army and Navy enthusiasts quietly watching in the back of the hearing room) he consistently avoided inferences which could have placed his subcommittee on the front page of every newspaper in the country.

• **The Case for RW**—In 1954, a few men anticipated the post-Sputnik hysteria of our citizenry and laid the groundwork for today's missile and space programs, reported Mr. Ramo. At that time, he and Dean Wooldridge had left Hughes Aircraft Co. to found their firm. They worked with a dozen or so top scientists, executives, and military men on the Strategic Missile Evaluation Committee. It was headed by the late Dr. John von Neuman. The committee decided the Atlas weapon system was possible to build and that it could be operational in half the time ordinarily required to give the AF a new weapon. The problem: No company (or the AF) had the abilities and facilities to do the whole job. A new type firm was needed to give the program systems engi-

neering and technical direction. Ramo-Wooldridge was chosen. Its attributes: The two men themselves; their ability to bring other highly qualified scientists to their team; and the fact that the firm was backed financially by Thompson Products Co., a Cleveland firm well known to the AF.

• **Growth**—Ramo-Wooldridge grew from 170 personnel directly involved in the missile program in 1954 to 2580 missilemen in 1958, says the subcommittee. Thompson's original investment of $165,000 combined with $8700 each from Messrs. Ramo and Wooldridge formed the kernel of what became a multimillion dollar property. During the 1954-58 period, Thompson loaned the firm about $16 million. (The Renegotiation Board has cleared Ramo-Wooldridge's profits for 1954-56.) Representative Holifield estimated that a $2 share of the original stock was worth $831 when the company merged into Thompson on Oct. 31, 1958, to become Thompson Ramo Wooldridge Inc. Personal gains for Messrs. Ramo and Wooldridge appear to be about $2.5 million each, while they received annual salaries ranging from $37,500 to $50,000. Other topflight scientists of the firm got salaries ranging from $11,000 to $42,000 a year.

Before the merger, Space Technology Laboratories was a division of Ramo-Wooldridge. In the merger, it became a subsidiary corporation of Thompson Ramo Wooldridge, but operationally, was completely separated from the new parent company.

Today, said General Schriever: "We have 1000 scientists and engineers on the Space Technology Lab staff—some of the most outstanding men in the country. Half have advanced degrees." Biggest results: The Thor became operational six months ahead of the original Von Neuman schedule; the Atlas (to be operational by June), is about one year ahead of schedule. One of the most significant feats of the AF-Ramo Wooldridge relationship: It licked the problem of administrative bureaucracy. Higher echelons in the AF and Defense Department demanded many levels of review on decisions which could have been reached "promptly at the project level," noted Secretary Douglas. But General Schriever's missile division cut that red tape.

• **Battle of Washington**—Outspoken General Schriever added: "I have been in the R&D business a long time. People are always shooting at your program. The only way to win in Washington is to have a strong management team." The point: Individual aircraft firms (because they want the hardware contracts) tend to push their own programs in Washington. Concluded Secretary Douglas: "We have nothing to apologize for." Cost of the ballistic missile program approaches $4 billion; Ramo-Wooldridge and Space Technology Labs have received about $100 million (less than 3 per cent). In contrast, said the secretary, hardwaremakers usually get 6 to 7 per cent of the basic contract.

Mr. Dunn claimed Ramo-Wooldridge's "willingness" to keep itself out of the hardware business greatly limited its profitmaking ability and assured the AF of "objective technical competence," demanded by the Von Neuman committee. Defending his firm against the profiteering charge, he stated: "The value of all company furnished facilities is $18 million, of which $4.9 million is furnished to the government." This is contrary to the "normal situation, where contractors receive facilities from the government." Profits were less than those earned by major airframe and missile production contractors. Mr. Ramo reported retained earnings of Ramo-Wooldridge were $5 million.

• **Scientists' Salaries** — Mr. Dunn says two scientists resigned recently from Space Technology Labs—"outstanding people on whom we heavily depended"—for 40 per cent salary increases and stock option rights. Sixty-six top men left the company last year, mostly for more money. While 93 government scientists went to Ramo-Wooldridge between 1954 and 1956, Mr. Dunn stated one of the firm's most serious problems is "the retention of our key people." Last year, the firm spent $800,000 recruiting. It costs about $2200 to hire one scientist. The turnover rate runs from 10 to 15 per cent a year and is up "markedly" in the last year, he said, adding: Space Technology Labs is "more subject to pirating than anyone else in the industry."

Implying a defense of his firm's high salaries, Mr. Ramo spoke out: "A lack of exploratory development holds us (the U. S.) back. We must start more R&D than we can finish. We are in danger of not uncovering the breakthroughs as rapidly as we could." Hitting close to the core of the problem, General Doolittle pointed out: The government must hire the people or firms it needs. "In the future we must consider how much a man knows and what he can contribute . . . and accept criticism" of high salaries, or a lack of objectivity. He mildly reminded the subcommittee: "Complete objectivity is difficult to achieve."

Koppers May Build Plant

A steelmaking plant using the Strategic-Udy process may be built in Canada. Koppers Co. Inc., Pittsburgh, has received a letter of intent from a group of Canadian companies.

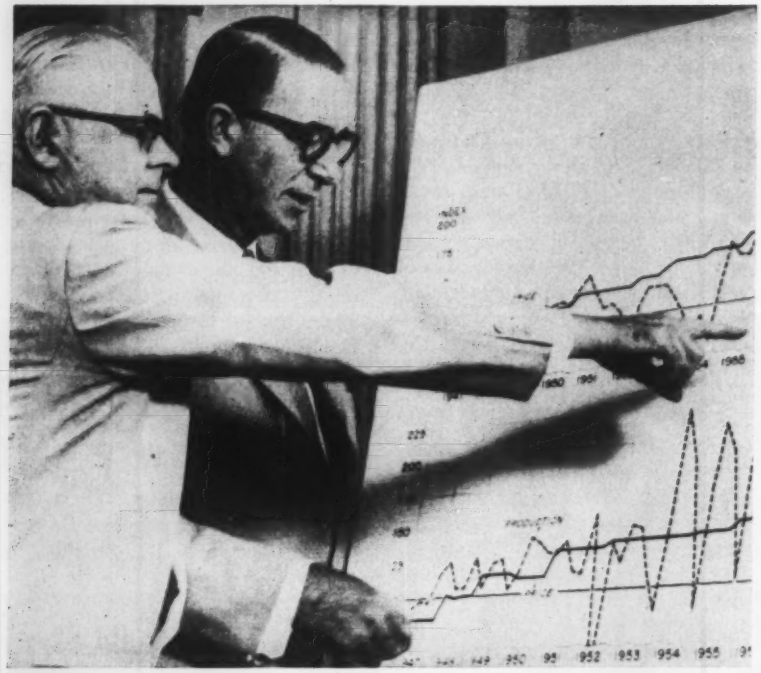
The process was developed to convert many different grades and types of iron ores into semirefined steel, bypassing the blast furnace, coke ovens, and open hearth furnaces. Frank Senior, manager, development section of Koppers, says negotiations are far advanced on another job using the Strategic-Udy process.

Plants using the process can be built at a cost of $30 to $50 per annual ingot ton of capacity, Mr. Senior declares.

Packaged Homes Pick Up

Home manufacturers expect to increase sales this year by an average of 20 per cent. Estimates of increases range from 10 to 112 per cent in a 25-company survey by Home Manufacturers Association.

Last year's production soared to an estimated 110,000 homes; an 18 per cent increase over 1957 and a 366 per cent increase for the last 10 years. Conrad Harness, HMA's executive vice president, predicts that within the next 15 years, half of America's homes will be factory packaged.



Washington's top trustbusters, Assistant Attorney General Victor R. Hansen, left, and Sen. Estes Kefauver (D., Tenn.) study steel industry production and price trends

Justice Battles Bigness

General Motors and steel companies are likely to get microscopic examinations by grand juries. Action is underway in New York. San Francisco probe slated for April

ONE of the biggest three ring circuses in history is being prepared by the Justice Department. It has some of the most luminous stars the industrial world has ever produced.

• **In the First Ring**—The main event is underway in New York where a grand jury is investigating the bigness of General Motors Corp., the largest U. S. manufacturer.

• **In the Second Ring**—In April, a grand jury will begin looking into the steel industry on the West Coast. Featured performers: Columbia-Geneva Steel Div. of U. S. Steel Corp., the world's most colossal steelmaker; Bethlehem Pacific Coast Steel Co., part of Bethlehem Steel Corp., the nation's No. 2 steel giant; and Kaiser Steel Corp., billed in 1959 for the first time as the No. 1 steel producer on the West Coast.

• **In the Third Ring**—U. S. Steel is tentatively scheduled to make its second appearance of the show in a New York grand jury investigation of its bigness.

GM Possibilities

On Feb. 4, Justice caught GM and the country by surprise by subpoenaing its records, some dating back to 1929, for a grand jury probe into the full scope of the company's activities. Company officials are remaining quiet about the matter while they study the order, but it is no secret that they are irritated by this climax to prying which has been going on for five or six years.

Observers in Detroit see it this way: GM will comply with the subpoena and hand over records. Government officials will probably want more and elicit countercharges that the jury is exceeding its limits. The byplay could go on for several months before agreement is reached. Deliberations of the jury will take several more months. If a lawsuit comes out of it, you can be sure that a series of appeals (regardless of the outcome) will tie it up in the courts for many months.

Onlookers are speculating on three possible results of the grand jury probe:

1. A criminal suit could be brought against GM for violation of antitrust laws. Justice usually prefers this action on grand jury investigations.

2. A civil suit could result, based on evidence uncovered by the jury which could not be obtained otherwise. It could lead to the eventual breakup of the corporation into several competing companies, with the corporation's financing division (General Motors Acceptance Corp.) coming in for the most attention.

3. No lawsuits, but eventual antitrust legislation based on the jury's findings.

It appears that GMAC is the principal target. If the investigation fails to split the financing branch away from the parent company, a bill introduced by Sen. Joseph C. O'Mahoney (D., Wyo.) may do the same thing. It prohibits auto manufacturers from financing auto purchases. Ford Motor Co., which has announced its intentions of entering the financing field, is closely watching developments.

West Coast Squabble

At the same time Justice dropped its GM bombshell, Victor R. Hansen, assistant attorney general, warned of a full scale investigation of possible price fixing and unfair distribution of steel on the West Coast. About 30 steel firms are expected to be subpoenaed for this one, states Lyle Jones, chief of the San Francisco office of the department's Antitrust Division. He said the probe probably would not begin before the new federal jury is con-

vened at San Francisco in April, and that all companies concerned would have ample time to answer the orders.

All three principals—Columbia-Geneva, Bethlehem Pacific Coast Steel, and Kaiser—emphatically deny that they have any knowledge of the investigation—except what they have read in the papers.

Some west coast steel fabricators and producers feel this is the climax to a long squabble among independent fabricators and steel companies with fabricating subsidiaries.

The independents claim that the big producers give their fabricating divisions an unfair advantage which allows them to win bids on price and delivery terms which the smaller companies cannot meet.

But one Pacific Northwest fabricator told STEEL he can see no basis for the jury study. "We feel the producers have done a good job of distributing their output. There are times when we feel the pinch, but we have always been able to get our historical allotment when things have been tough." A small San Francisco shop feels the investigation will be good for the industry. "When things are slack, we can get all we want, but when business picks up, we can't roll with it because we are held to a historical pattern."

Big Steel Breakup?

The biggest question mark involves the report that U. S. Steel's bigness will be investigated. The news broke last Monday, with officials at USS denying any knowledge of it. STEEL queried government officials in both New York and Washington, and they would neither deny nor affirm the rumor. Usually reliable sources say that they know subpoenas are being prepared.

The investigation allegedly will deal with: 1. The possibility of breaking Big Steel up in areas where it has a major share of the steel market. 2. An end to the present pricing system, supposedly taking the cue from Sen. Estes Kefauver's (D., Tenn.) investigation into administered pricing last year.

Like most three ring circuses, spectators are going to have trouble watching all three acts at once, but it ought to be quite a show.

Breaks Aluminum Record

The home improvement industry consumed a record 300 million lb of aluminum building products in 1958—40 million lb over the 1957 figure, says John R. Quinn, director of architectural and construction markets, Reynolds Metals Co.

He attributes the expansion to: 1. Maintenance-free advantages of aluminum. 2. Research and development which has resulted in new products and finishes. 3. Sales promotion programs sponsored by major aluminum producers, fabricators, and dealer applicators. (Reynolds will spend about $2.5 million in advertising and promoting aluminum building products in 1959.)

In addition to more usage of aluminum siding, gutters, downspouts, and combination windows and doors, Mr. Quinn sees substantial increases in roof shingles, shutters, soffit and fascia materials for home improvements this year. Reynolds recently introduced what are said to be the first aluminum roof shingles in baked-enamel color finishes.

Recession Hits Germans

West German iron and steel production suffered a moderate decline in 1958. Crude steel production slipped 7 per cent, totaling 25.1 million tons, vs. 27 million tons in 1957.

Raw iron ore output dropped to 19.8 million tons (iron content: 5.23 million tons) from 20.2 million tons in the previous year (iron content: 5.32 million tons). Pig iron production slid 9.3 per cent to 18.3 million tons.

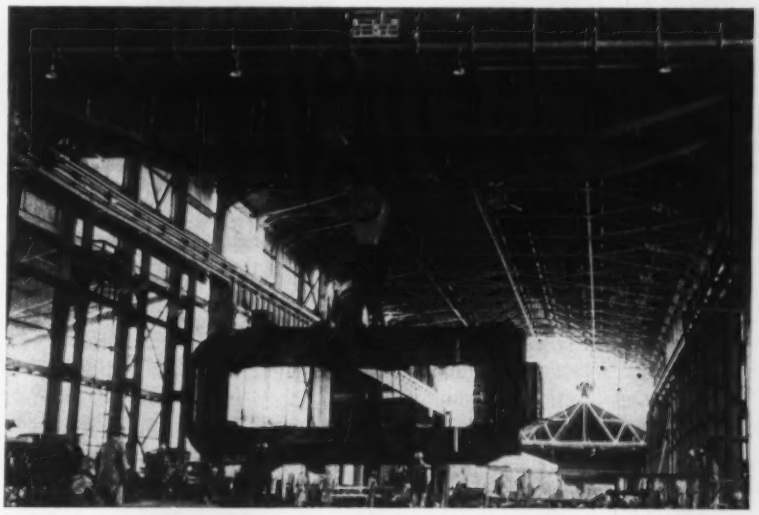
Production of finished rolled steel products came to 16.7 million tons, compared with 18.1 million tons in 1957, a 7.5 per cent drop.

Lackawanna Growth Seen

Ranking high in Bethlehem Steel's expansion plans is a 25 per cent increase in capacity at its Lackawanna plant. Edmund F. Martin, vice president-operations, says the expansion will take place when demand for steel warrants it. Planned facilities would add about 1,500,000 tons of ingot capacity at an estimated cost of $250 million.

Expansion emphasis would be on plate and structural steel products. Plans include a new plate mill, a slabbing mill, and basic facilities, including two blast furnaces, an open hearth shop, and three coke oven batteries.

Annual capacity at Lackawanna has been expanded to 6 million ingot tons from 3 million tons since 1950, a 67 per cent increase.



THIS HUGE ALUMINUM CRANE is more than 50 tons lighter than an equivalent steel crane, permitting a saving in building support and structural member cost at Reynolds Metals Co. Alloys Plant, Sheffield, Ala. The 150 ton (rated capacity) crane, 32 ft wide with 80 ft span, was fabricated from Reynolds' ½ and 2½ in. aluminum plates by Milwaukee Crane Div., Cudahy, Wis., Industrial Enterprises Inc.

Can We Have a Long Range Atom Plan?

PUBLIC HEARINGS start tomorrow on the "development, growth, and state of the atomic energy industry." This is an annual affair for the Joint Atomic Energy Committee. Sen. Clinton Anderson (D., N. Mex.), chairman, says the hearings will center on our power program. Industry's attitudes will receive special attention. "The optimistic plans of industry have not come about. We intend to look into the problems which have served as deterrents to the advance of the industry," forecasts the senator.

The committee also promises to ask industry and the Atomic Energy Commission about nonelectric power applications of the atom (like process steam and heating), isotope development, and the maritime program. The atom plane and problems in disposal of atomic waste are also high on the list of committee interests.

What concerns the committee most is our lack of a workable long range (five to ten year) power program. Headline catching ventures like Operation Plowshare (using an atom bomb to blast loose oil shale or create a new Alaskan harbor) take the public's mind off the more serious needs of the 1970s, many committee members believe.

With Lewis Strauss moved over to the Commerce Department and John McCone installed as AEC chairman, these congressmen (many of them westerners who tend to recognize power shortages before some of their eastern brothers) think the time is right to force the AEC to act. The big Democratic majority of both houses will help, because one of the big issues is the administration's reluctance to commit huge sums of federal money for years ahead.

Economic Spur Is Lacking

Senator Anderson describes the committee's efforts to get a program: "I am determined that a concrete, understandable program for insuring that this country takes its proper place in the development of the peaceful uses of atomic energy for power shall be enacted in this Congress."

Admitting that industry has already made heavy expenditures, the senator points out that more spending may not come because industry does not feel "the economic compulsion" to act. Fossil fuels are plentiful, and new sources of energy, like shales and lignites, are on the immediate horizon. Industry is also reluctant, he says, because it fears that what starts as government aid will end in government ownership.

To get around those problems, he endorses a plan to have the AEC build first generation prototype reactors (with industry participation under "exceptional circumstances"). On second generation plants, he wants a subsidy to private industry up to 90 per cent of the differential between the cost of a nuclear plant and that of a conventional plant. The hooker on this: He believes public power groups and co-operatives should receive "comparable" subsidies. Private industry will fight that on the ground that it encourages unfair competition from public power interests. Outlook: No one will be surprised if the long range view is again mired in the conflicting interests of power groups.

Secretary of Science Is Needed

Sen. Hubert Humphrey (D., Minn.) and Sen. John McClellan (D., Ark.) have dropped a bill into the hopper creating a secretary of science who would "oversee all matters relating to science." AEC, National Science Foundation, National Aeronautics & Space Administration, and National Bureau of Standards would come under the new secretary's jurisdiction.

Some observers are predicting passage on the ground that the White House is cluttered with science advisory groups. Why not make it official with cabinet rank for one man and give him the organizational power which advisory committees lack?

Space Program Previewed

Part of the interest in a science secretary is based on the administration's admittance before several Congressional committees that we are behind the Russians in space development programs. As with atomic energy development, to some congressmen the cause appears to be partly a lack of long range planning. NASA Chief Keith Glennan estimated an 18 months' lag to the House Science & Astronautics Committee.

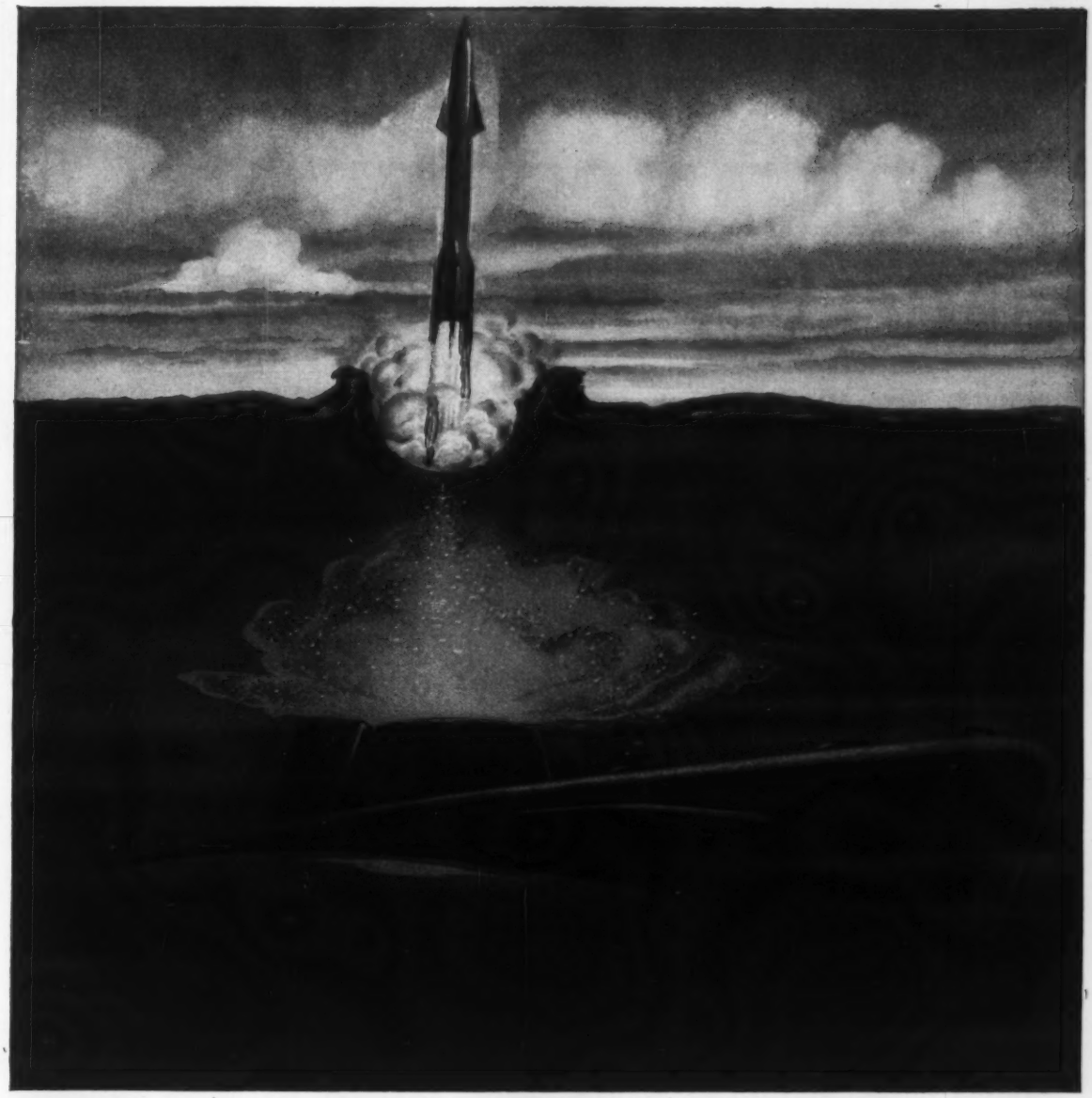
He gave this preview of events through 1966:

1. By 1960, a second stage will be used on the Atlas to hoist a 6000 lb payload into orbit around the earth, or a 1000 lb payload to the moon.

2. By 1962, a 20,000 lb payload can be sent around the earth (or a 4000 lb payload beyond the moon) with a cluster of engines supplying 1.5 million lb of thrust.

3. By 1964, we should have a single engine capable of 1.5 million lb of thrust.

4. By 1966, we may be able to cluster four of those engines to put 150,000 lb into orbit.



Underwater weapon . . . with wings!

A major American weapon is shaping up in the U.S. Navy. It's the *Polaris*—a new guided-missile system designed for underwater firing from a nuclear-powered submarine. These mobile, elusive launching sites make defense against Polaris practically impossible.

The heart of this deadly weapon is a complex guidance and fire-control system, now under joint development by the Navy and private industry. Without rugged, reliable electrical insulations, such as those CDF supplies, these intricate electronic controls simply wouldn't work.

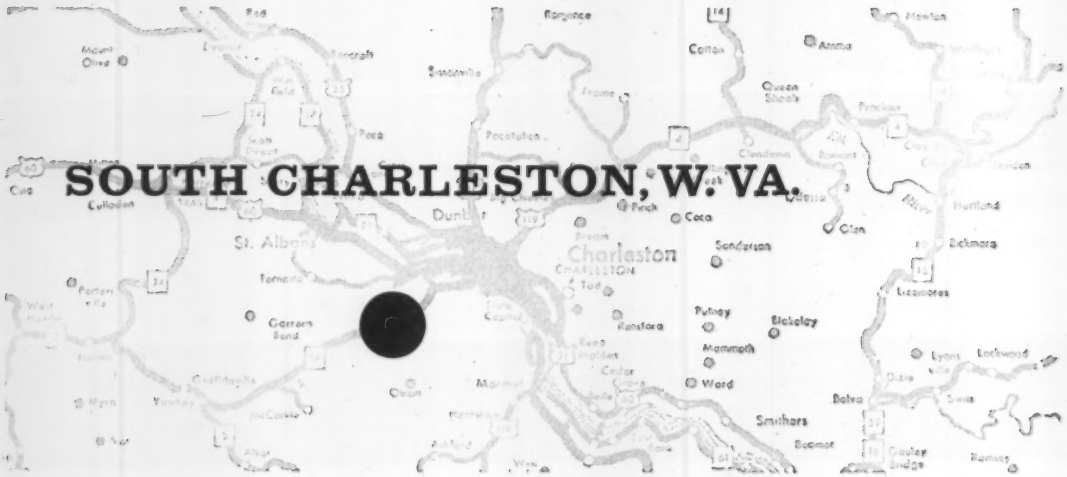
CDF, a subsidiary of The Budd Company, has pioneered dependable electrical insulations for over sixty years. You'll find CDF products almost everywhere—in the aircraft, automotive, communications, and railway fields, to name a few.

Have you a "problem product"—one that CDF insulation could improve? See Sweet's Product Design File and other directories for the name and phone number of your CDF sales engineer. Send your print or your problem; we'll return pertinent technical literature and recommendations.

CDF **CONTINENTAL-DIAMOND FIBRE**

A SUBSIDIARY OF THE Budd COMPANY • NEWARK 85, DEL

COLUMBIA-SOUTHERN ADDS ANOTHER NEW FACILITY TO SERVE YOU BARIUM CHEMICALS



Columbia-Southern announces the production of Barium Chemicals at South Charleston, West Virginia. This plant produces top quality barium chemicals, related chemicals and carbon bisulphide. The location of the plant, in the heart of the Ohio Valley chemical region, is well suited for prompt deliveries. Columbia-Southern looks forward to the opportunity of serving your barium chemical needs. Your inquiries are invited.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

A Subsidiary of Pittsburgh Plate Glass Company • One Gateway Center, Pittsburgh 22, Pennsylvania

Anhydrous Ammonia, Barium Chemicals, Benzene Hexachloride, Calcium Chloride, Calcium Hypochlorite (Pittchlor®, Pittabs®), Carbon Tetrachloride, Caustic Potash, Caustic Soda, Chlorine, Chlorinated Benzenes, Chloro-IPC, Chrome Chemicals, Hydrogen Peroxide, Muriatic Acid, Pacific Crystals, Perchlorethylene, Rubber Pigments (Calcene®, Hi-Sil®, Silene®), Soda Ash, Sodium Bicarbonate, Sodium Sulfate, Titanium Tetrachloride, Trichlorethylene

Here's What Miami Offers

These are the vital areas you will want to check in any plant location shopping you do:

1. **Communications:** First class mail is air lifted; 1959 brings direct distance dialing.
2. **Construction & Land:** Land supply is short, saturation expected in 1975.
3. **Electric Power:** Plenty available, but rates are the highest in Florida.
4. **Finance:** Most commercial banks have new business, foreign trade departments.
5. **Fuels:** City will be connected this year to Texas natural gas pipeline.
6. **Government:** State government is termed "conservative," fire and police protection above average.
7. **Industry Wanted:** No heavy, basic producers; partmakers, precision tool firms preferred.
8. **Labor:** Pool of skilled labor is called last unlimited source; state has Right-To-Work law.
9. **Markets:** Retail market is good; Latin-American export trade is active.
10. **Taxes:** No tax concessions given; no state or local income tax.
11. **Transportation:** Air facilities are good; city is served by two seaports.
12. **Water & Waste:** Heavy industrial wastes may be a problem; water is plentiful.

Miami Woos the Light Industries

ATTENTION: Steel mills, foundries. Don't move to Miami, Fla.

In a novel promotional approach, Dade County Development Department openly courts some types of companies, discourages others. Citing Miami's climate as a major attraction, a 300-page survey of the county claims the area is the nation's last unlimited source of skilled labor, formed by a "hidden labor pool" of workers who have migrated from their home town jobs to bask in the sun.

• **Drawbacks, Too** — The survey points out, however, that power rates are too high for big users, the location is bad for heavy, long distance shipping, and that steel mills and iron foundries, after all, do dump wastes into the water and smoke up the sunny resort air. Land is getting scarce, too, admits the report.

It says that high ground saturation is imminent in 1975 without a wholesale reclamation of swampland.

What does Miami want? In a specific outline of acceptable firms, the survey points out companies which produce electronic components; make plastic products; conduct research for the home office; or are engaged in light fabricating, precision partmaking, or allied fields.

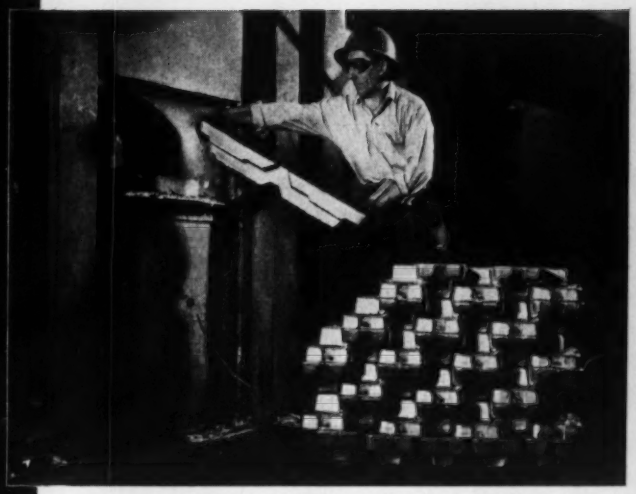
Among its assets (besides climate and labor supply), the area boasts plenty of dependable electric power, airborne handling of first class mail, and low construction costs resulting from intense competition among builders.

Benefits which industry will enjoy at law, says the report, include a Right-To-Work amendment to the state constitution; rigid building codes; and no state taxes on inheritance or income.

• **Five-Foot Yardstick** — Applicants for a commercial location in Miami are evaluated by the Community Net Worth Analysis, devised by the Development Committee of Dade County. The analysis measures a company's effect on: 1. The community in terms of labor relations. 2. Air and water pollution. 3. Consumption of resources. 4. Burden on transport systems. 5. Effect on established business.

New handling efficiency. Locking one to another to form stable, rigid loads, new Alcan TRI-LOK ingots give you easier, faster handling with a wide variety of equipment . . . safer, more compact stacking. Save time from car unloading to storage and furnace charging.

Additional distribution (Alcan Foundry Alloys:) **Apex Smelting Co.,** Chicago, Cleveland, Los Angeles • **Charles Batcheider & Co.,** Botsford, Conn.



Free standing. Alcan TRI-LOK ingot bundles maintain their rigidity and stability even when unbanded. This free-standing advantage is a real timesaver in carrying, storing and furnace charging. For Alcan TRI-LOK bundles need no pallets or special slings for pick-up, can be set right on the bare floor . . . safely.

Cuts unloading time. Alcan TRI-LOK bundles take the roughest handling. Interlocking design prevents "rolling" or "fingering" in transit . . . deep grooves keep straps tightly in place. The result: bundles arrive in excellent condition, ready for fast unloading by fork-lift truck. Alcan TRI-LOK bundles save checking time, too. Every bundle is a convenient one-ton, 40-ingot unit.

From Aluminium research . . .

ALCAN TRI-LOK ...a new ingot form especially designed to reduce your handling costs!

From a fabricator standpoint, the new Alcan TRI-LOK ingot may well be the most meaningful advance ever made in aluminum ingot design.

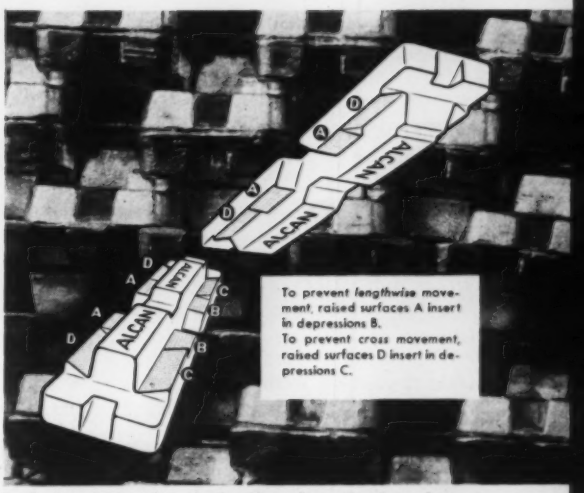
Here's a way to save time in every phase of ingot handling—the new Alcan TRI-LOK ingot!

Newest of Aluminium's ingot developments, Alcan TRI-LOK remelt ingots are especially designed for faster, more efficient handling. You see this handling ease in the safe, stable way the new ingots bundle and stack—locking one to another, not in just one, but in three different ways. The result: measurable cost savings in car unloading, handling and storage operations.

For information on the new Alcan TRI-LOK design—or aluminum in any other ingot form—just call or write your nearest Aluminium Limited sales office.

Aluminium Limited

*Ingot Specialist...*serving
American Aluminum Fabricators—



Exclusive 3-way interlock. The Alcan TRI-LOK design is unique in that it prevents lateral movement of any kind. Within the stack or bundle, ingots are "mated" one to another, actually locking in three different ways. Despite excellent stacking stability, there's never an unlocking problem. *Just lift to separate!*

In the U.S.—Aluminium Limited Sales, Inc., 630 Fifth Ave., New York 20, N. Y. CLEVELAND • CHICAGO • LOS ANGELES • DETROIT • ATLANTA

Engineer Shortage To Recur; Counter It with Creativity

METALWORKING'S rapid recovery promises to revive an old problem—a shortage of topnotch engineers. The deficit will continue into the '60s. But you can ward off its harmful effects by preparing for it now. One effective way: Develop a company climate that encourages creativity.

The payoff is great: More new ideas to give you a competitive edge; higher morale; greater productivity; lower turnover; a need for fewer recruits.

• **The Need**—Increasing the flow of new ideas is an important task at any time; it becomes critical with a shortage of creative personnel.

About 40,000 students will get bachelor's degrees in engineering this year, around 41,000 next year, about 43,000 in 1961. But the demand for engineers will "substantially exceed 46,000 per year," estimates Deutsch & Shea Inc., New York technical manpower consultants. Result: Accounting for losses, a shortage of at least 15,000 engineers during the three years.

• **It's Tough Here**—In greatest demand will be the engineer with both technical and administrative ability; they're already in short supply. You can also expect serious shortages of mechanical, industrial, chemical, electrical, and aeronautical engineers. Metallurgical engineers will be a little easier to hire. Civil and mining engineers will be in relatively good supply. Hard to find will be some specialists: Operations research people, systems and methods experts, electromechanical engineers.

• **It's Long Term**—Stopgap measures won't solve the problem because the coming shortage promises to be a lasting one. National Science Foundation predicts the number of engineering graduates won't hit 50,000 per year until 1965 (when it may jump to 55,000 or more).

Demand is rising much faster than that. Engineering employment is climbing more than three times as fast as total employment. Industry will have about 950,000 engineers on its payroll next year; about 1,550,000 by 1970, estimates the National Science Foundation. Engineers make up about 1.2 per cent of today's civilian labor force, vs. 0.91 per cent in 1950. And the trend line keeps curving sharply upward.

The demand for engineers follows the trend of research and development expenditures and new plant and equipment outlays. Metalworking is boosting R&D expenditures more than 4 per cent yearly and capital spending will start to climb again later this year.

• **Its Consequences**—The projected shortage can lead to hoarding of engineers, "raiding," curtailment of research, lofty salaries, inadequate training, and other undesirable developments.

You can ward off such problems—if you start assembling your defense now. You'll have to devise programs aimed at holding the men you have and hiring the new men you want. You can do it through a company climate that will bring out each individual's creative ability.

• **Plan of Attack**—Your engineers probably aren't working even close to their potential. A Deutsch & Shea survey of 105 leading scientists and administrators concludes: Most companies, if they don't actually stifle creative potential, do little to develop it. The interviewees mentioned several problem areas. Let's take a look at them with an eye toward possible solutions:

• **Conformity**—About two-thirds of

the panelists cited pressure to conform as a major block to creativity. They indicate that you'll get more new (and rewarding) ideas from your engineers if you allow them to be different. Says Prof. Franklin J. Shaw, Department of Psychology, Purdue University: "Our intolerance of unpressed pants and overdue haircuts doesn't speak too well for our understanding and appreciation of individuals possessing interpretive talent."

• **Teamwork** — Emphasizing teamwork in R&D projects is a deterrent to creativity, many panelists assert. They say discussion and pooling of knowledge are helpful, but overemphasis on teamwork greatly reduces individual initiative and independence. The creative man is motivated from within, they say.

Perry R. Mason, course development engineer, General Electric Co., asserts: "A group atmosphere is not generally stimulating to the development of creative talent." Echoes Paul Trentham, administrative assistant, Westinghouse Electric Corp.: "We must remember that an idea originates in the mind of one man."

The panelists admit that teamwork is good in strictly problem-solving situations.

• **Recognition**—A prime motivating factor among engineers is self-satisfaction—but too few employers inform the men on the results of their efforts. "Too many organizations seem to soft-pedal and attempt to hide from the man the full value of his contribution," reports A. H. Nicholson, director of design, Federal Glass Co. "Encouragement for invention should be financial and graduated with the importance of the invention. Generally, assessment of its future impact leaves much to be desired," says Dr. Leo Steg, manager, Aerosciences Laboratory, GE Missile & Space Vehicles Dept.

Since the researchworker seldom learns the value of an invention and much time must pass before it is expressed or capitalized, there's a great need for frequent spot evaluations and enthusiasm for any new idea by supervisors, declares John W. Lincoln of Arthur D. Little Inc.

Fred C. Finsterbach, education and training consultant, adds that technical people seldom are given any incentive but money when what they crave is a climate that allows freedom to be creative. A pleasant, quiet workplace helps. Some consultants recommend that you put no more than four engineers in one office and place lab facilities nearby. But the biggest step toward establishing the right climate must be taken in the philosophy and attitudes of top management, most respondents indicate.

• **Top Level Aid**—Deutsch & Shea lists steps top management can take: 1. Learn to understand creative people and the creative process. 2. Be willing to take chances and calculated risks. 3. Deliver adequate, concrete rewards for accomplishments; spell out carefully and demonstrate incentives. 4. Recognize researchers' dedication to their science; accept the long range goals and objectives of research. 5. Indicate your firm's areas of interest so the men can choose their areas of concentration with enthusiasm. 6. Maintain open communication channels. 7. Give prestige to creative people; establish honors of the purely professional sort.

• **Gamble**—Seven in ten panelists say the we-can't-afford-to-take-chances attitude of management is the greatest inhibitor of creative achievement. Says Professor Shaw: " 'Creativity within limits' is like being just a little bit pregnant. The creative spirit is an all or none proposition."

Reports Deutsch & Shea: Where management refuses to gamble, the problems given to technical people are too specific and well defined or too short range to permit important creative contributions. The men are asked to follow an orderly, direct, prescribed pattern to get a desired result. That blocks opportunities for basic advances whose payoff might be far greater in the long run.

• **Support** — Creative men resent spending time on details. Those can often be handled by a lower salaried employee. A large eastern utility found that its 850 engineers were spending only 45 per cent of their time on engineering work. By using skilled technicians, the firm cut 150 men from its engineering crew.

It's important to find out how many men you need now—and how many you'll need in the future. Example: At GE, requirements for graduates, classified by major disciplines, are forecast for ten years.

• **Facilities**—Here's how the panelists ranked seven proposals to improve working conditions: First: Adequate supporting personnel. Second: Up-to-date lab equipment. Third: A special library for the group. Fourth: Reference materials at each man's desk. Private offices and small lab room were judged less important; isolation from other departments was considered relatively unimportant by most, even harmful by some.

• **Desires**—Here's how the panelists voted (by percentage) on personal creativity motives:

- Desire to solve problems—68.6%.
- Personal gratification from accomplishment—64%.
- Desire to win scientific prestige—64%.
- Desire to advance financially—42%.
- Desire to advance in title—14.3%.
- Desire to win in competition—12.4%.
- Gaining special benefits (bonuses, trips, vacations)—4.8%.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Tube for English Channel?

The long dreamed of tunnel under the English Channel may become a reality in a few years. A French firm, Le Groupement d'Etudes de Tunnel sous la Manche, began a two year study of the project last year.

The financial feasibility of a tunnel is being reviewed by the Economist Intelligence Unit of London, Societe d'Etudes Techniques et Economiques of France, and Leuro, Cather & Co., Chicago.

Construction of a tunnel would overcome the principal natural and transportation cost obstacles to a free flow of goods between England and the European continent.

"We are WELL SATISFIED with our

BULLARD

Cut Master V.T.L., Model 75

Extreme accuracy is mandatory for a number of machining jobs at the Fuller Company, Manheim, Pa. For example, according to Mr. M. L. Strayer, Machine Shop Supt. "the largest volume piece we process on our Cut Master, Model 75, is the facing of seats for cement diverting valves. They must be perfectly flat. This critical operation is done so accurately on the Bullard Cut Master, Model 75, that with a little hand lapping we have an airtight joint."

This machine has a 24" extra high bed, speed range 6.8 to 250.0 R.P.M. Equipped with 5 sided Turret Head and 4 sided Side Head, both hand indexing, 4 jaw hand operated chuck.

This "built-in" accuracy, which is inherent in every Bullard Cut Master V.T.L., Model 75, can be applied to your work.

CALL YOUR BULLARD SALES OFFICE
OR DISTRIBUTOR FOR THE COMPLETE STORY

THE BULLARD COMPANY

BRIDGEPORT 9,
CONNECTICUT

Station Wagon Sales Gain; Near Peak

STATION WAGONS have quickly snared so much of the market that the next few percentage points of penetration will be hard to come by. They accounted for 15.3 per cent of the 1958 model run and are pushing two door hardtops (16.9 per cent) as the second most popular body style. Two door sedans are first. In 1957, wagons took 13.6 per cent of the market; two door hardtops claimed 18.4 per cent. Wagon sales are expected to peak around 17 to 19 per cent of total output. So from here on out progress will be slow.

Four door wagons remain most popular. Only 2.3 per cent of last year's sales were two doors. There are no industry figures available on the ratio of six to nine passenger models sold, but several divisions indicate about an 80/20 split in favor of the six passenger jobs. The ratio doesn't hold in the low priced field. Plymouth, Chevrolet, and Ford reportedly sell two six passenger wagons for every nine passenger rig. The most successful nine passenger models are those with the third seat facing to the rear. This setup is available on all Chrysler Corp. lines, GM's Chevrolet and Pontiac.

• **Price Helps** — The low priced three are the top sellers. Last year, they accounted for 19.3 per cent of all low priced car sales. Slightly more than 10 per cent of the medium price sales are in wagons. The figure in the high price class is less than 2 per cent.

Plymouth leads in station wagon sales. Some 28 per cent of its 1958 sales were wagons, against 20 per cent for Ford and 15 per cent for Chevrolet. The percentages are holding true this year.

Studebaker-Packard Corp. claims Lark models are selling well—although the company refuses to say how well. American Motors Corp. reveals 42 per cent of its Rambler American output now is in wagons.

• **Small But Roomy**—One reason

How the Various Makes Measure Up

(Cargo space dimensions in inches)

KEY:

LM—Floor length from bottom front seat to inside raised tailgate.

LN—Floor length from bottom of second seat to inside raised tailgate. Ford's figure is for nine-passenger models. Figure for its six-passenger models is 58.2 in.

HN—Maximum height of roof above floor at car center line.

WR—Maximum width of cargo space at floor.

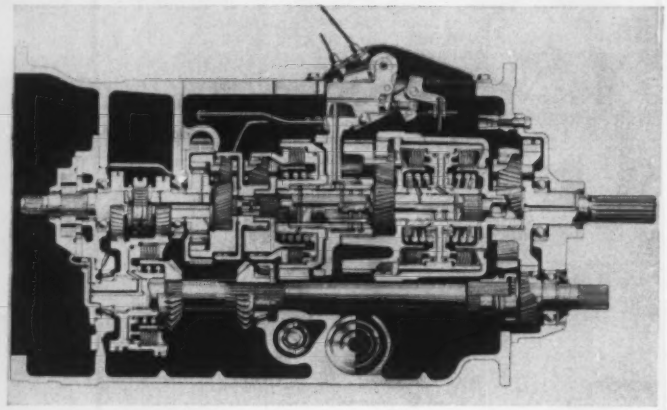
WN—Rear end opening width at top of tailgate.

Source: AMA Specifications.

MAKE	Lengths LM	LN	Height HN	Widths WR	WN
Chevrolet	94.8	60.0	32.1	66.0	46.0
Pontiac	93.6	58.2	32.2	66.0	48.0
Oldsmobile	91.6	56.9	30.1	63.3	49.5
Buick	94.4	61.5	28.4	63.3	49.5
Ford	94.4	60.5	33.6	60.4	44.3
Edsel	94.3	60.5	30.0	59.7	44.3
Mercury	99.9	61.3	33.5	66.1	46.3
Plymouth, Dodge, De Soto, Chrysler	98.6	64.5	33.0	62.5	50.7
Lark	82.5	46.5	35.3	58.2	44.1
Rambler	82.4	48.5	29.1	59.5	47.8
Rambler American	74.3	37.9	31.3	59.4	38.5

(Material in this department is protected by copyright, and its use in any form without permission is prohibited.)

Ford, GMC Offer New Drives



TWO transmissions, one for tractors and one for intercity buses, have been announced by Ford's Tractor & Implement Div., and GMC Truck & Coach Div.

Ford's Select-O-Speed (above) has ten forward speeds and two reverse. It's automatic with a hydraulic power shift. Gear ratio changes can be made with the tractor in motion. Shifting is done by moving a selector lever until the desired ratio shows in a window next to the lever. Several power takeoff combinations are possible.

Power shifting is provided by three internal hydraulic clutches and three bands controlling three planetary gear sets. A fourth planetary gear set gives constant gear reduction.

• **Hydrashift**—GMC's bus transmission provides overdrive in all four forward speeds to give faster acceleration and improved fuel consumption. The device is designed for both direct and overdrive in each ordinary transmission gear. Shifting between direct and overdrive is done under full power without operating the clutch simply by moving a button on the shift lever. It actuates hydraulic pressure which alternately engages or disengages each of two clutch systems. It simplifies split shifting.

for the American's success stems from its cargo space (Page 111). Although the car's wheelbase is 8 in. shorter than the Rambler or Lark, its cargo space is less than a foot shorter and about as wide. The cheapest American wagon ($2060) lists for $235 less than the lowest priced Lark wagon ($2295). It averages $270 less than larger Ramblers ($2562). Ford's wagons start at $2567; Chevrolet's at $2571; Plymouth's at $2574.

Rumor has it that AMC will offer a roof type cargo carrier on the American this month or next at no extra cost. This is a rebuttal to the $100 price cuts GM made last month on its imported Vauxhall and Opel wagons.

• **Watch These**—If you're thinking of buying a station wagon this year, don't stint yourself on power in favor of economy. Plymouth doesn't even offer a six cylinder engine for its heavier vehicles.

Watch for tubeless tires that leak air. Several manufacturers are recommending that dealers use tubed tires on the rear of the larger models.

Trouble with GM Light Car?

A specially numbered Corvette body is scheduled for prototype buildup at GM's Fisher Body Div. around the first of April, say company insiders. Despite GM's latest security pledge from its top management, Motordom knows that this "special Corvette" is really GM's light car which has been scheduled for fall introduction.

Now Detroit's wondering if the debut may be delayed. Talk has it that Chevrolet has bogged down getting the "Corvette" aluminum engine underway at Massena, N. Y. Originally, it was scheduled to have a permanent molded aluminum head and crankcase with gray iron finned cylinders sandwiched between. But Massena reportedly hasn't been able to get its permanent mold lines set up satisfactorily.

So Detroit is buzzing with stories that a cast iron block may be substituted—at least at first. The rumor just isn't so. GM's little job is already tail heavy. Any additional weight would call for a complete suspension redesign which is costly and takes too long.

It is known that Massena has brought in some diecasting machines and dies. It may possibly try to pull the head and crankcase out as aluminum diecastings instead of permanent molded parts.

Assembly and manufacturing facilities at Chevrolet's Willow Run, Mich., plant (and at Detroit Transmission Div. across the street) are proceeding on schedule.

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February		392,112
March		357,049
April		316,503
May		349,474
June		337,355
July		321,053
August		180,324
September		130,426
October		261,696
November		514,099
December		593,920
Total		4,243,526

Week Ended	1959	1958
Jan. 10	133,362	120,140
Jan. 17	135,953	109,761
Jan. 24	126,843	107,495
Jan. 31	119,678	104,359
Feb. 7	117,124†	109,028
Feb. 14	118,000*	101,656

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

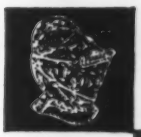
Master mechanics like the Wean "Flying Press" as much as presidents do

The Wean "Flying Press" does one thing extremely well: it produces stamped parts at absurdly low costs per piece. This pleases management because the cost reduction it makes possible helps widen the profit spread in finished products.

To find the reason for the master mechanic's satisfaction, we must examine the operating characteristics of the "Flying Press," a difficult job to do in print. First, the "Flying Press" is completely unique among stamping presses, producing parts from coil without stop-and-go indexing at the press. But, far from making the equipment *more* difficult to operate, this "Flying Press" principle eliminates the use of clutch, brake and fly-wheel; all points of potential press break-down! And there's less danger of die breakage with the "Flying Press," both during set-up and operation, since automatic devices to protect the tooling are built-in.

We could go on with a list of many other advantages which the Wean "Flying Press" offers over ordinary designs, but there's just too much to cover. However, we have summarized the general points of superiority in a booklet which we'll gladly send you. If you'd prefer, one of our sales engineers will be glad to discuss the "Flying Press" in regard to your specific production at your convenience.

May we hear from you, to send the booklet or call?

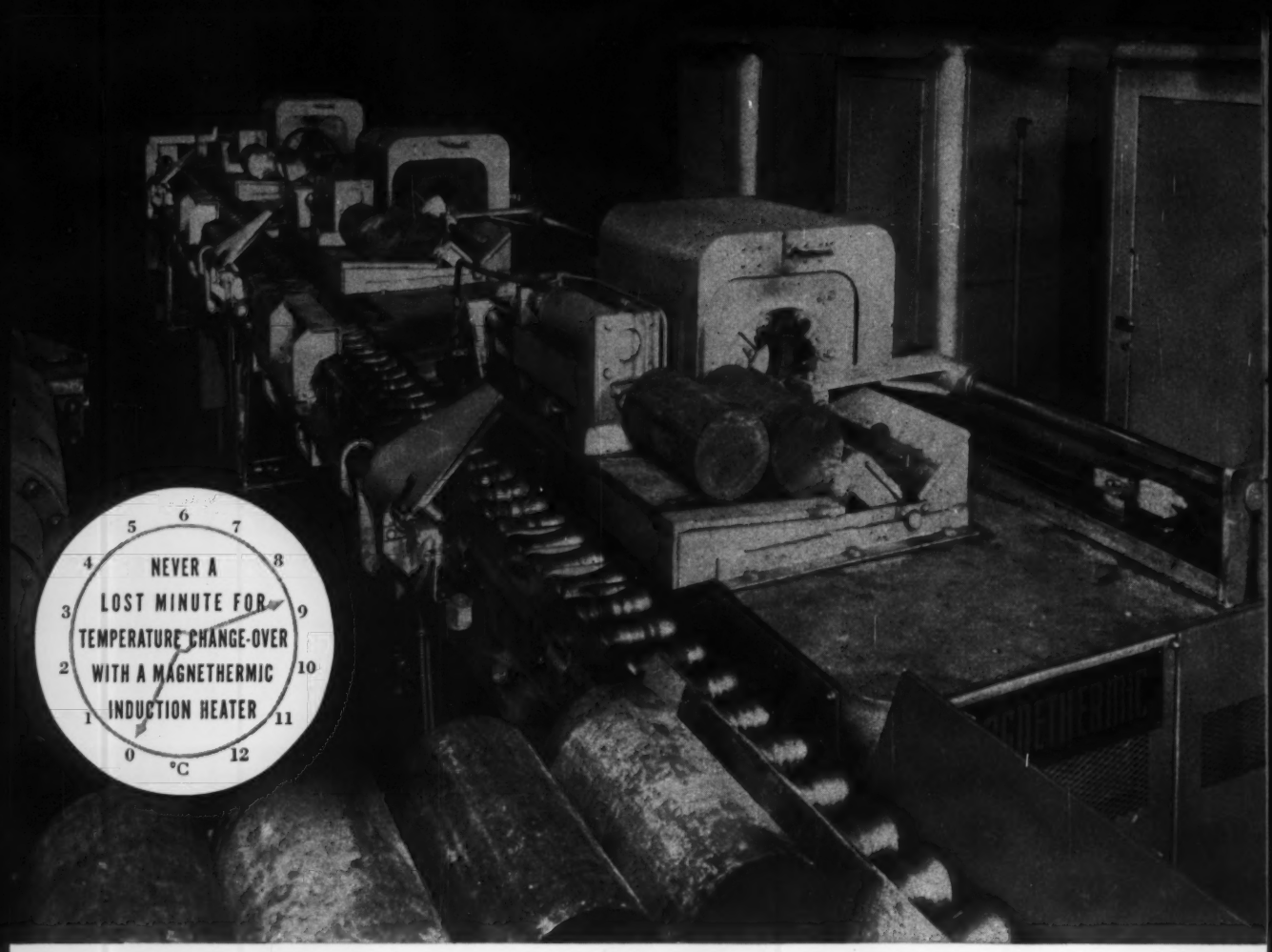


WEAN

WEAN EQUIPMENT CORPORATION

CLEVELAND 17, OHIO

Detroit • Chicago • Newark



"This installation is Wolverine Tube, Division of Calumet & Hecla, Inc., Detroit, Michigan"

Three Magnethermics, 60 cycle, heating 8" x 15" copper and brass billets for a 3000-ton extrusion press. Each heater is individual of the other, operating from a common loading and unloading conveyor. One, two, or three heaters can be used, depending upon production requirements.

Flexibility for emergency orders - *you never have to plan ahead for a temperature change-over...*

SET THE DIAL — PRESS THE BUTTON — HEATED BILLET

You never have to backlog billets with a Magnethermic Induction Heater. Operator dials the temperature, presses the button, and a uniformly heated billet will be ready in moments. And the next billet and the next will be the same temperature. The Magnethermic heater also records the temperature of each billet so that you have a permanent record for checkback.

When a rush or emergency order upsets the day's schedule, the operator sets the dial to the new temperature and the Magnethermic is ready to deliver immediately. No costly shutdowns normally associated with fuel firing.

More than temperature can be changed over without production delay on a Magnethermic . . . size of billet or type of alloy, as well as temperature, can be adapted in minutes.

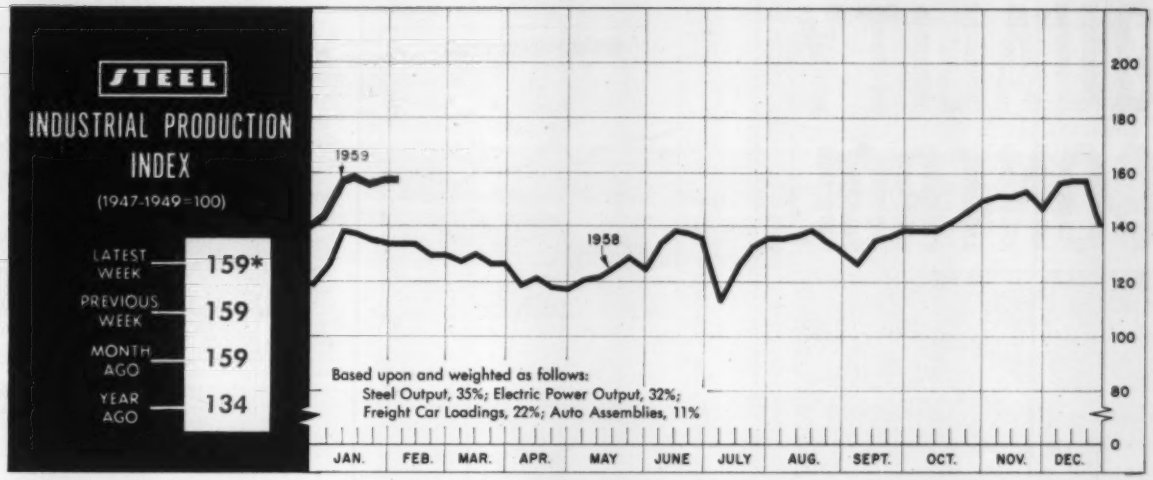
This flexibility more than offsets the higher original costs, as many users of Magnethermics have confirmed. Once you have an induction heater, you can forget about the billet heating for your forging presses, extrusion presses or rolling mills. No more stockpiling. No more backlogging. No more long shutdowns.

Any metal that can be heated can be heated by a Magnethermic Induction Heater . . . low, dual or high frequency. There are Magnethermics in operation for aluminum, beryllium, copper, columbium, magnesium, molybdenum, nickel and nickel alloys, platinum, carbon and alloy steels, titanium, and vanadium.

Your Inquiry...

Any information on costs or procedure will be promptly sent in response to your request.

MAGNETHERMIC®
CORPORATION
3990 SIMON RD. • YOUNGSTOWN 7, OHIO



*Week ended Feb. 7.

Business Recovery Reaches Plateau

THE RECOVERY from last year's recession has hit its first plateau. It does not mean that the upturn has been halted, but it will be two or three months before we'll see gains similar to those racked up in the fall.

• **Exhibit No. 1**—STEEL's industrial production index above shows that the sidewise movement through January is extending into February. In three of the last five weeks of record, the trend line has held at the 159 mark (1947-49=100). This is one of the few ways in which this upturn differs from those following the two previous recessions. They had enough strength to boom through the midwinter months, which normally are marked by a falloff in business activity.

The stability of our index is caused by the marked improvement in the steel industry. Operations for the week ended Feb. 15 were scheduled at about 83.5 per cent of capacity, good for 2,363,000 net tons of steel for ingots and castings. It's the highest output in nearly two years. The industry's record of 2,525,000 net tons was set in the week ended Dec. 22, 1956. Today, that would be almost 90 per cent of capacity, a mark that could be reached within the next two or three months.

Electric output and railroad freight carloadings are in their normal seasonal declines, and the auto industry has been held below anticipated schedules because of a glass shortage at Chrysler Corp. Because none of these factors is expected to improve in the immediate future, a stalemate is developing in the index which will not be broken until spring influences (in April or May) push it upward again.

• **Exhibit No. 2**—Analysis of the business trend indicators which STEEL publishes periodically (four appear on the next two pages) shows a noticeable easing in the upward movement within the last

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	2,363[1]	2,288	1,445
Electric Power Distributed (million kw-hr)	13,200[1]	13,151	12,289
Bituminous Coal Output (1,000 tons)	8,555[1]	8,005	8,120
Crude Oil Production (daily avg—1,000 bbl)	7,100[1]	7,107	6,858
Construction Volume (*ENR*—millions)	$284.2	$418.2	$322.9
Auto, Truck Output, U. S., Canada (*Ward's*)	151,543[1]	152,257	135,283
TRADE			
Freight Carloadings (1,000 Cars)	560[1]	583	532
Business Failures (Dun & Bradstreet)	322	296	326
Currency in Circulation (millions)[3]	$31,121	$31,150	$30,579
Dept. Store Sales (changes from year ago)[3]	+8%	+5%	−2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$25,026	$25,116	$22,778
Federal Gross Debt (billions)	$285.8	$286.5	$274.4
Bond Volume, NYSE (millions)	$31.7	$33.2	$24.2
Stocks Sales, NYSE (thousands of shares)	16,141	18,720	12,371
Loans and Investments (billions)[4]	$95.2	$95.6	$86.2
U. S. Govt. Obligations Held (billions)[4]	$32.1	$32.3	$25.9
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	239.15
STEEL's Nonferrous Metal Price Index[6]	218.8	218.2	201.0
All Commodities[7]	119.2	119.5	118.6
Commodities Other than Farm & Foods[7]	127.3	127.4	125.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,488; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

COMPLETE

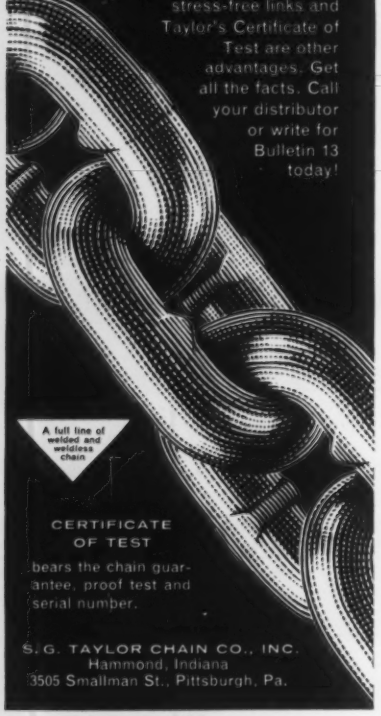
QUALITY CONTROL

another advantage of

factory-made

alloy sling chains!

Taylor's well-known quality control —gamma ray testing . . . controlled heat-treating . . . professional inspectors—give TM factory-made Alloy Sling Chains the big edge over do-it-yourself types. Patented Tayco Hooks, stress-free links and Taylor's Certificate of Test are other advantages. Get all the facts. Call your distributor or write for Bulletin 13 today!



A full line of welded and weldless chain

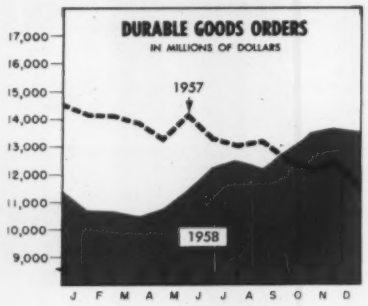
CERTIFICATE OF TEST

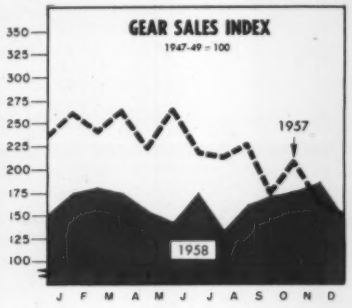
bears the chain guarantee, proof test and serial number.

S. G. TAYLOR CHAIN CO., INC.
Hammond, Indiana
3505 Smallman St., Pittsburgh, Pa.

Taylor Made CHAIN SINCE 1873

THE BUSINESS TREND





	New Orders* 1958	New Orders* 1957	Sales* 1958	Sales* 1957
Jan.	10.704	14.176	12.646	14.941
Feb.	10.688	14 102	12.038	14.808
Mar.	11.488	13.853	11.670	14.198
Apr.	10 833	13 234	11.532	14.254
May	11 423	14.115	11.643	14.296
June	12.245	13.249	12.086	14.207
July	12 512	13.005	12.256	14.573
Aug.	12.177	13.160	12.3*5	14.297
Sept.	12 859	12 519	12.723	14.132
Oct.	13.530	12.154	12.943	13.932
Nov.	13.600†	12.434	13.300†	13.548
Dec.	13.500†	11.399	13.600†	13.092

Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.

Charts copyright, 1959, STEEL.

	1958	1957	1956	1955
Jan.	174.5	259.3	245.5	140.9
Feb.	179.1	239.5	256.2	148.5
Mar.	173.7	262.4	276.5	172.8
Apr.	153.2	221.7	264.7	179.8
May	142.2	263.2	275.6	205.2
June	173.8	215.9	245.4	193.5
July	133.3	211.4	286.7	201.7
Aug.	162.1	225.8	219.5	217.6
Sept.	170.7	174.9	230.5	246.5
Oct.	175.9	207.0	299.8	227.6
Nov.	182.7	165.3	216.2	210.4
Dec.	145.5	150.8	235.7	245.5
Avg	163.9	216.4	254.4	198.3

American Gear Mfrs. Assn.

two months. Forty-five of these statistical series are of importance to metalworking in shipments and production, orders and sales, backlogs, prices and wages, and employment. Two months ago, two-thirds of them showed a month-to-month improvement. Today, only 22 are above the previous month's levels. The slowdown has been most apparent in new orders, while shipments are still reflecting the earlier improvement in bookings.

Year-to-year comparisons show a much more optimistic, but misleading, picture. Twenty-seven of the series are ahead of their corresponding year-ago figures, with significant laggards showing up in the backlog and employment categories. Two months ago, only 12 of the indicators were above their year earlier marks.

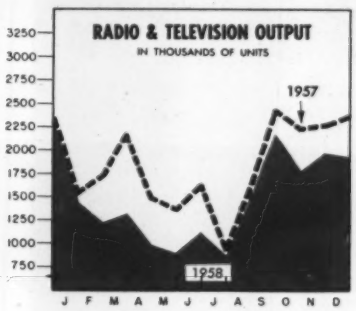
• **Growing Difference**—There has been some improvement since December, but the widening gap has been caused even more by the rapid downward movement of the year-ago trend lines. Even if the indicators maintain a status quo for the next two or three months, their relative improvement over 1958's figures will appear much more impressive than the facts warrant.

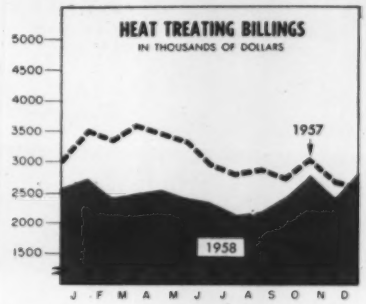
A case in point is railroad freight carloadings. They have been one of the weakest segments of the economy for many months, but within the last few weeks loadings have been running as much as 6 per cent above year-ago figures. Yet they are still well below the weekly totals for any comparable period in recent years.

Buyers Only Lukewarm

Purchasing agents continue to report improvement in both new orders and production. But the Business Survey Committee of their national association says: "The consensus does not reflect any emphatic optimism in most industries." More new orders were received in January than in December by 46 per cent of the members, compared with 32 per cent who reported betterment in the last month of 1958. Forty-two per cent reported production on the up side, compared with 35 per cent the month before.

Employment continues to tag behind production. Only 22 per cent reported higher payrolls in January, the same figure as in December. Less than half of the respondents believe employment will rise during 1959.





	Radio		Television	
	1958	1957	1958	1957
Jan. ...	1,026	1,086	434	450
Feb. ...	877	1,265	370	465
Mar. ...	931	1,609	417	560
Apr. ...	697	1,116	303	361
May ...	655	1,024	287	342
June ...	774	1,088	377	544
July ...	622	613	275	360
Aug. ...	1,029	986	507	674
Sept. ...	1,572	1,611	622	833
Oct. ...	1,322	1,569	496	662
Nov. ...	1,546	1,689	438	575
Dec. ...	1,526	1,793	415	574
Totals ..	12,577	15,429	4,921	6,400

Electronic Industries Association.

	1958	1957	1956
Jan.	2,780.4	3,533.9	3,116.4
Feb.	2,436.4	3,378.9	3,124.8
Mar.	2,495.4	3,631.8	3,330.9
Apr.	2,542.6	3,572.4	3,166.2
May	2,421.5	3,389.6	3,350.7
June	2,374.8	2,912.1	3,094.5
July	2,139.6	2,767.5	2,737.4
Aug.	2,213.0	2,830.8	3,136.6
Sept.	2,457.1	2,765.0	2,858.6
Oct.	2,744.9	3,076.2	3,468.5
Nov.	2,422.0	2,677.2	3,238.2
Dec.	2,799.4	2,579.3	2,998.9

Metal Treating Institute.

While a majority of the members feel that the recession trend has been reversed, only 24 per cent show any inclination to rebuild inventories. In fact, 27 per cent report that they are still reducing stocks.

Credit Head Optimistic

"While the momentum of the recovery from last year's recession has lost some of its extra zip, business will be good this year, and corporate profits will be better than they were in 1958," predicts Edwin B. Moran, executive vice president of the National Association of Credit Management. But unemployment may continue at a high level, partly because "labor unions will be more demanding, resulting in a general rise in wages, forcing prices upward, with another round of inflation held in moderate check only through the credit restraint exercised by the Federal Reserve."

Mr. Moran feels that pressure on bank reserves will tighten credit; corporations will increase their working capital; and expenditures on research for new processes and products will exceed the current rate of $10 billion a year. He also predicts that the annual rate of production in the auto industry may reach 6.5 million to 7 million units by March.

Steel Wage at Record

The cost of making steel continues to rise. The average hourly payroll cost for wage earners in the iron and steel industry in 1958 was $3.181, compared with the prior record of $2.917 in 1957, reports the American Iron & Steel Institute. But the payroll came to only $3.5 billion last year, compared with about $4 billion in 1957. Average employment of 551,000 was substantially under the prior year's figure.

In December, the average workweek rose to 37.3 hours, compared with 36.5 hours in November and an average of 35.2 hours for the year as a whole.

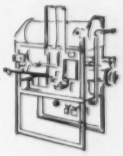
Employment To Rise

Employment will increase during the first quarter, believe 19 per cent of the respondents to a nationwide survey by Manpower Inc., Milwaukee. Two-thirds think payrolls will remain near the current levels. For all of 1959, 47 per cent expect employment to hold while 35 per cent look for an uptrend.

WILLIAM C. DIMAN, Atmosphere Equipment Specialist, reports . . .

MODERN METALS DEMAND MODERN ATMOSPHERES

Ever since 1927, when Hayes perfected the first controlled-atmosphere furnace, we have made a steady effort to further the technology of protective atmosphere heat treating. By recommending proper atmosphere equipment, we have helped customers increase production, obtain uniform product quality, and save processing time and trouble. Today, our atmosphere generator line, probably the most comprehensive in the business, includes:



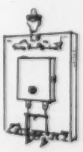
Exothermic Generators . . . for oxidizing or medium-reducing type atmospheres. Standard sizes from 200 CFH to 50,000 CFH.

Endothermic Generators — for reducing and carbon potential atmospheres. Standard sizes from 100 CFH to 20,000 CFH.

Ammonia Dissociators — for producing hydrogen-nitrogen atmospheres of high purity and low dew point. Standard sizes to 5,000 CFH, or multiples thereof.

Nitrogen Generators — for 99.99% pure inert gas at less than 20¢ per cubic foot. Standard sizes from 1,000 CFH to 10,000 CFH.

Forming Gas Generators — for producing controlled ratios of nitrogen and hydrogen from dissociated ammonia. Standard sizes 500 CFH, 1,000 CFH, and larger upon request.



Molecu-Dryer (with LINDE'S Molecular Sieves) — for drying, sweetening, purifying protective atmospheres down to dew points of minus 100° F. Standard sizes from 250 CFH to 6,000 CFH and larger on request.

Hayes offers more than just equipment. Our engineering organization and experimental lab are ready to help make sure you get a "Results Guaranteed" solution to your heat treating or protective atmosphere problem. Write for descriptive bulletins.

C. I. HAYES, INC.

Established 1905

839 WELLINGTON AVE. • CRANSTON 10, R. I.

ELECTRIC FURNACES

It pays to see HAYES for metallurgical guidance, laboratory facilities, furnaces, atmosphere generators, gas and fluid dryers.

Another Tinnerman Original...

Cost-cutting Tubular **SPEED CLIP®** takes positive "bite" to hold assemblies tight!

In seconds, you can front-mount trim, name plates, grilles, knobs, insulation, with Tubular SPEED CLIPS. And at interesting savings in assembly time and costs!

Snap these quality spring-steel fasteners into holes in metal, plastic or wood. Then press the mounting studs, nails or rivets into the clips to complete the attachments... anywhere along your assembly line.

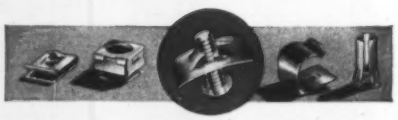
As the SPEED CLIP is inserted, spring fingers compress, then expand behind the panel to lock tight. The rolled-in end permits easy entrance, but bites hard into the stud to prevent back-off or vibration-loosening.

Tubular SPEED CLIPS are available for a full range of stud sizes and panel thicknesses. Permanent lock or removable types.

Check your Sweet's Product Design File (Section 8/Ti) for data on Tubular SPEED CLIPS and other SPEED NUT brand fasteners. Then call your Tinnerman representative for samples and additional information. If he isn't listed under "Fasteners" in your Yellow Pages, write to:

TINNERMAN PRODUCTS, INC.
Dept. 12 • P. O. Box 6688 • Cleveland 1, Ohio

TINNERMAN
Speed Nuts®



FASTEST THING IN FASTENINGS®

CANADA: Dominion Fasteners Ltd., Hamilton, Ontario. GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales. FRANCE: Simmonds S. A., 3 rue Salomon de Rothschild, Suresnes (Seine). GERMANY: Mecano-Bundy GmbH, Heidelberg.

EDMUND V. DOWDEN
Electric Controller works mgr.

CARL J. DEMRICK
Chrysler-Amplex president

PAUL W. NORRIS
Denison Engineering president

HAROLD J. HEGMAN
Queen Products p. a.

Edmund V. Dowden was named works manager, **Electric Controller & Mfg. Div.**, Cleveland, Square D Co. He resigned as vice president, Osborn Mfg. Co., where he was manager of the Brush Div. He rejoins Square D after an eight-year period.

Carl J. Demrick was named president, **Amplex Div.**, Chrysler Corp., Detroit. He succeeds **G. W. Trichel**, who assumes new duties as military adviser to the group vice president-defense and special products. Mr. Demrick was vice president-manufacturing for Plymouth Div. **William C. Cawthon** was made plant manager at Plymouth. He is succeeded as plant manager at Dodge Div. by **Joseph B. Neal.**

Hart-Carter Co., Peoria, Ill., elected **P. E. Henseler** president; **W. A. Holtzman**, chairman and treasurer; **C. C. Ingraham** and **R. L. Miller**, vice presidents; **E. E. Nuhn**, secretary.

Sidney Dennis was elected president of **Dennis Chemical Co.**, St. Louis. **Frank Gollub** was made vice president-research and development; **Milton Carlie**, sales manager; **Marvin Wool**, chief chemist.

Koppers Co. Inc. named **John N. Moore Jr.** southwestern district manager, Dallas, Metal Products Div.

American Coldset Corp., Teterboro, N. J., appointed **Howard W. Arnold** general manager of all its divisions. He will concentrate on development of new products and marketing and sales programs.

Paul W. Norris was elected president, **Denison Engineering Div.**, Columbus, Ohio, American Brake Shoe Co. Former vice president and general manager of the division, he succeeds **W. C. Denison**, who remains active as chairman of the division, and continues in his capacity as a vice president and a member of the management committee of the parent firm. Mr. Denison was the founder of Denison Engineering Co., which merged with American Brake Shoe in 1955.

James A. Brickett was made sales manager, **Arcos Corp.**, Philadelphia.

At **Betz Div.**, Danville, Ill., Bohn Aluminum & Brass Corp., **Wesley H. Markson** was made administrative sales manager; **Donald J. Jessup**, manager, unit department.

Weirton Steel Co., Weirton, W. Va., division of National Steel Corp., appointed **Guy H. Curtis Jr.** assistant to the vice president-sales; **C. H. McConnell**, administrator of general office sales; **W. W. Culley**, assistant administrator-general office sales. Mr. Curtis was with Kaiser Metal Products Inc. **W. F. Pelletier** was named sales manager, Bar & Structural Div.

George D. Brengelman was promoted to general superintendent, Fairfield Steel Works, Fairfield, Ala., **Tennessee Coal & Iron Div.**, U. S. Steel Corp. He is succeeded as general superintendent of TC&I's Ensley Steel Works by **Haran W. Bullard. Eugene K. Graham** was made assistant general superintendent at Fairfield.

Harold J. Hegman was made purchasing agent, **Queen Products Div.**, Albert Lea, Minn., King-Seeley Corp. He was purchasing director for Multi Clean Co., St. Paul.

David M. Andrews, former superintendent of maintenance, was promoted to general superintendent, **Chase Metal Works** plant, Waterville, Conn., division of Chase Brass & Copper Co. He is succeeded by **George A. Finn Jr.**

Linde Co., division of Union Carbide Corp., appointed **E. R. Behnke** manager of molecular sieve products. Former sales manager for these new materials, Mr. Behnke is responsible for sales, production, and technical development, with headquarters at the New Products Laboratory, Tonawanda, N. Y. **William B. Nicholson** was appointed a vice president of Linde Co., New York, and **Robert F. Flood** was made vice president-gas products.

Archie C. Anderson was named technical director of **A. O. Smith Corp.'s** new Reinforced Plastics Div., recently organized with headquarters in Milwaukee. **Dwight H. Davis** was made division controller and administrative assistant. Mr. Anderson formerly headed the company's Reinforced Plastics Development Laboratory.

Duane R. Branaka was made general sales manager, **Sinclair-Collins Valve Co.**, and **Valvair Corp.**, Akron, divisions of International Basic Economy Corp. He succeeds **Jack M. Partridge**, who was assigned as

DERRICK L. BREWSTER
Inland Steel gen. sales mgr.

HENRY C. EGERTON
BullDog Electric gen. mgr.

CARL A. ANDERSON
Marion Electrical gen. mgr.

D. M. McDOWELL
Roots-Connersville Blower eng.

manager of Valvair's Cleveland sales office.

Derrick L. Brewster was named general sales manager, **Inland Steel Co.**, Chicago, to succeed **Robert M. Buddington**, recently elected sales vice president. **James C. Fausch**, former New York district sales manager, succeeds Mr. Brewster as assistant general sales manager. **John B. Judkins** transfers from the tin plate sales department, Chicago, to succeed Mr. Fausch in New York.

Henry C. Egerton was made general manager, **BullDog Electric Products Div.**, I-T-E Circuit Breaker Co., Detroit. He succeeds **William H. Frank**, retired.

John F. Ault was elected executive vice president, **Wall Tube & Metal Products Co.**, Newport, Tenn. **P. Frederick Lesley** was made factory manager. Mr. Ault was vice president-manufacturing and engineering of O. Ames Co., Parkersburg, W. Va. Mr. Lesley was chief engineer at Wall Tube.

Carl A. Anderson, former vice president in charge of Minneapolis-Honeywell Regulator Co.'s Aeronautical Div. in Canada, was named general manager of the company's recently acquired **Marion Electrical Instrument Co.**, Manchester, N. H.

Howard L. Jorgensen was appointed sales manager, Central Div., **Nichols Wire & Aluminum Co.**, replacing **Joseph H. Luebbe**, retired. The division transferred offices from Cincinnati to Cleveland.

William C. Erwin was named purchasing agent in charge of the production purchasing section, **Pesco Products Div.**, Bedford, Ohio, Borg-Warner Corp. Heading the nonproduction purchasing section is **George T. Weidinger.**

Alfred T. Blackburn was elected vice president-manufacturing, **Cincinnati Milling Machine Co.**, Cincinnati. Former works manager, he is succeeded by **Clyde Eby**, assistant works manager.

D. M. McDowell was appointed director of engineering, **Roots-Connersville Blower Div.**, Connersville, Ind., Dresser Industries Inc. He was with the Le Roi Div., Westinghouse Air Brake Co.

Dr. Lyman R. Fink was made general manager, Atomic Products Div., **General Electric Co.** He was general manager, X-Ray Dept., Milwaukee. He succeeds **Francis K. McCune**, former vice president and general manager, Atomic Products Div., who becomes vice president for atomic business development in the company's marketing services organization.

U. S. Steel Corp. announces retirement of **E. E. Moore**, assistant to the president and vice president, Pittsburgh; and **A. E. Terry**, general superintendent, Geneva Works (Utah), Columbia-Geneva Steel Div.

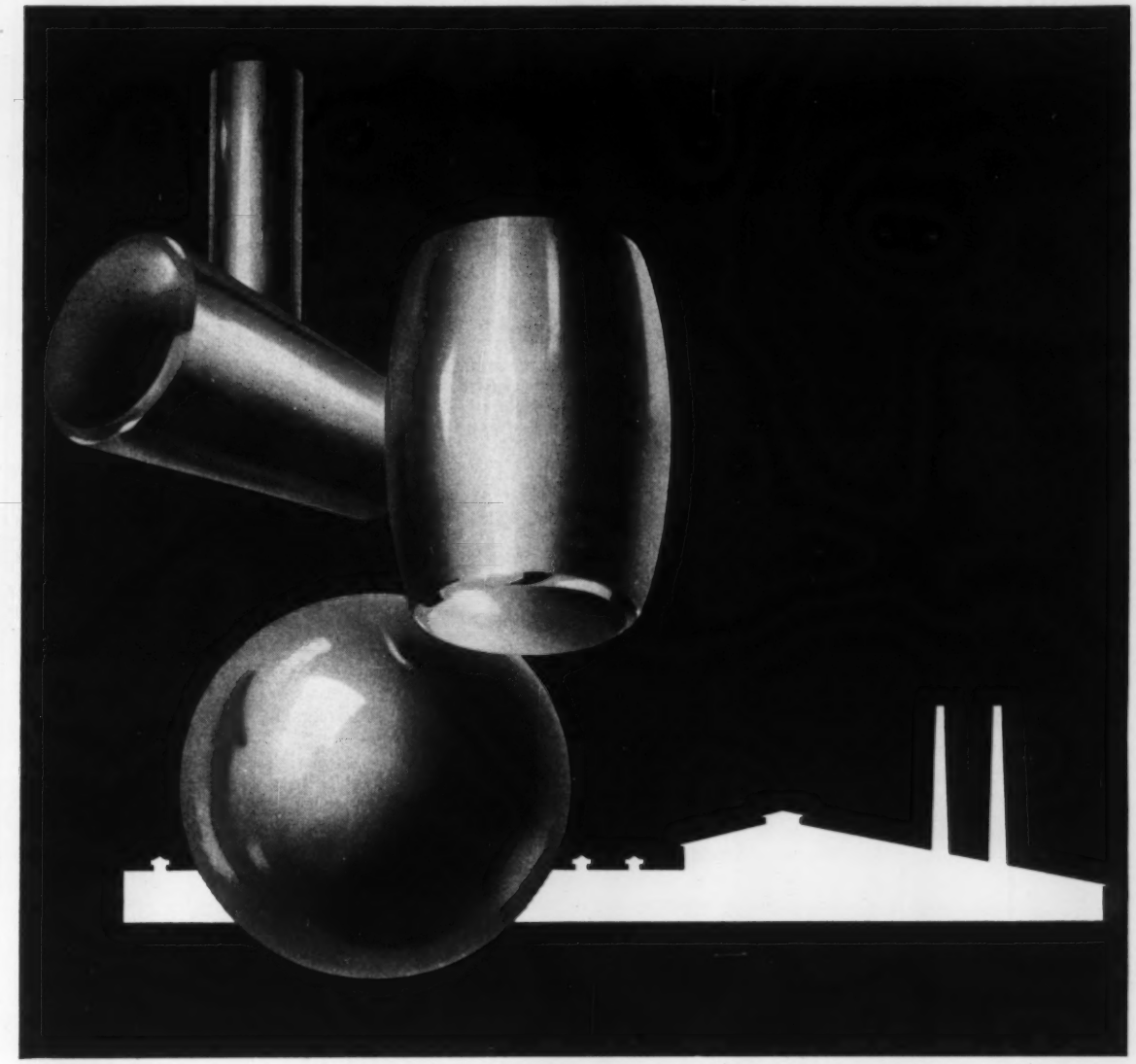
James S. Miller was made southwest district manager, **Cleveland Forge Works**, Forge & Fittings Div.,

JOHN F. AULT

P. FREDERICK LESLEY
Wall Tube & Metal Products posts

ALFRED T. BLACKBURN

CLYDE EBY
Cincinnati Milling Machine executives



the multi-purpose grease with "special" performance

Here is one multi-purpose grease that actually performs better than a great many "special purpose" greases for all types and sizes of bearings – even under extreme *pressure*, *temperature* and *moisture* conditions.

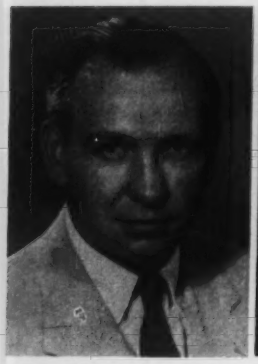
Nebula EP retains its outstanding lubricating properties at temperatures above the limits of a number of special heat-resistant greases. But unlike many high-temperature greases, Nebula EP possesses high anti-wear and load-carrying qualities – comparable to those of most specialized extreme-pressure greases. Nebula EP's *constant consistency-temperature characteristics are among its most outstanding features.* And Nebula EP's excellent oxidation stability assures long service and storage life.

Now available in three grades, Nebula EP is well suited to *all* types and sizes of bearings...can be applied by hand packing, grease cup or gun, or through a centralized system. For further information, contact your nearest Esso office in New England, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, the Carolinas, Tennessee, Arkansas, Louisiana, and the District of Columbia. Or write Esso Standard Oil Company, 15 West 51st Street, New York 19, N. Y.

NEBULA® EP

Esso

ESSO RESEARCH works wonders with oil



CHARLES J. CONLIN JR.
Harris-Seybold promotion

PAUL McSTOWE
Peterson & Neville v. p.

PETER C. PRIOR
Smith-Armstrong Forge pres.

I. S. HIRSCHHORN
New Process Metals v. p.

DR. PAUL ZIVKOVICH
heads new Mardigian division

DR. LLOYD T. DeVORE
heads Hoffman Science Center

H. K. Porter Company Inc. He is in Houston.

I. S. Hirschhorn was promoted from general manager to vice president and general manager, **New Process Metals Inc.**, Newark, N. J., subsidiary of Ronson Corp.

Dr. Paul Zivkovich was made general manager of the newly created Prototype Div., **Mardigian Corp.**, Detroit. He formerly served as executive vice president in charge of operations at Hart Metal Products Co., and division superintendent of National Lead Co.

Robert K. Warner was elected vice president-sales, **Hoyt Wire Cloth Co.**, Lancaster, Pa.

George H. Greene was named general manager of **Bethlehem Steel Co.'s** Johnstown, Pa., plant. He succeeds the late **A. J. Fisher.**

M. Robert Wilson was made general manager, **Pennsylvania Lawn Mower Div.**, Exeter, Pa., American Chain & Cable Co. Inc.

Hoffman Electronics Corp., Los Angeles, named **Dr. Lloyd T. DeVore** to organize a research division. It will be known as the Hoffman Science Center, will be housed in facilities to be constructed in the Santa Barbara, Calif., area.

Chris G. Fahy was promoted to director of quality assurance at **McCormick Selph Associates**, Hollister, Calif. For a number of years, he was quality control manager for Rheem Mfg. Co.

George E. Glover was named manager, Industrial Waste Dept., **Cochrane Corp.**, Philadelphia. He is in charge of activities in industrial waste treatment, and special ion exchange applications.

William P. Johnson was made sales manager, Metal Building Div., **United Steel Fabricators Inc.**, Wooster, Ohio. **Kenneth R. Kutz** was made assistant sales manager.

Clyde R. Braun was named manager of **Allis-Chalmers Mfg. Co.'s** Nuclear Power Dept., Milwaukee.

Charles J. Conlin Jr. was promoted to director of planning and controller, **Harris-Seybold Div.**, Harris-Intertype Corp., Cleveland. He retains responsibility for personnel activities.

Paul McStowe was made vice president-manufacturing, **Peterson & Neville Inc.**, Boston. He is in charge of production, purchasing, and internal operations for the firm, which recently completed the nuclear instrument housing fabrication of the *U. S. S. Triton.*

Peter C. Prior was elected president of **Smith-Armstrong Forge Inc.**, Cleveland. **Milan Zedlar** was elected vice president.

Edward W. Selis was made chief engineer, **Filmsort Co.**, Pearl River, N. Y., division of Miehle-Goss-Dexter Inc.

Don P. Selby succeeds **T. Lane Watson**, retired, as sales manager, Cincinnati district, **U. S. Steel Corp. Forrest W. Voss** succeeds Mr. Selby as assistant sales manager.

Ralph E. Whittaker Jr. was named steel sales manager, **A. M. Byers Co.**, Pittsburgh. He was with Universal-Cyclops Steel Corp.

G. M. Monroe was made director of **Chance Vought Aircraft Inc.'s** newly formed Business Planning Dept., Dallas.

John W. Freund was made central district manager, Pittsburgh, for the Metal Products Div., **Koppers Co. Inc.** He is succeeded as western district manager, Los Angeles, by **Sidney H. Fedan.**

OBITUARIES...

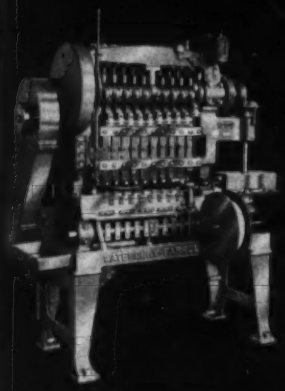
Timothy E. Levene, director of purchasing and production control, **Curtis Mfg. Co.**, St. Louis, died Jan. 30.

James O'Brien, 64, purchasing agent, **J. H. Williams & Co.**, Buffalo, died Jan. 29.

Hugo W. Hauser, 52, purchasing agent, Boston, Mass., Works, **Allis-Chalmers Mfg. Co.**, died Jan. 29.

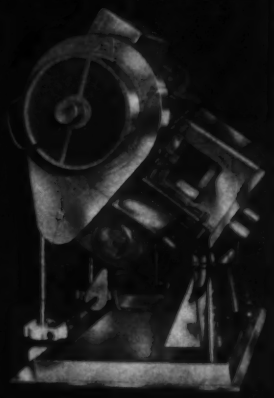
Wayne D. Dukette, 62, general manager in Los Angeles of Joseph T. Ryerson & Son Inc., died Feb. 3.

COLD HEADING
MACHINERY

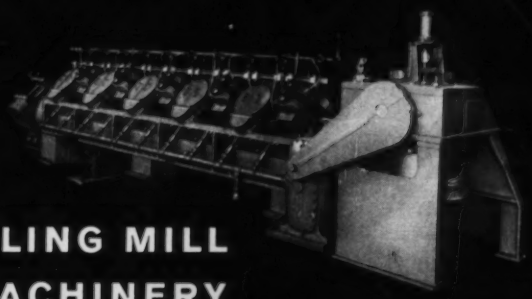


WATERBURY
MACHINERY BUILDERS
FARREL

POWER
PRESSES



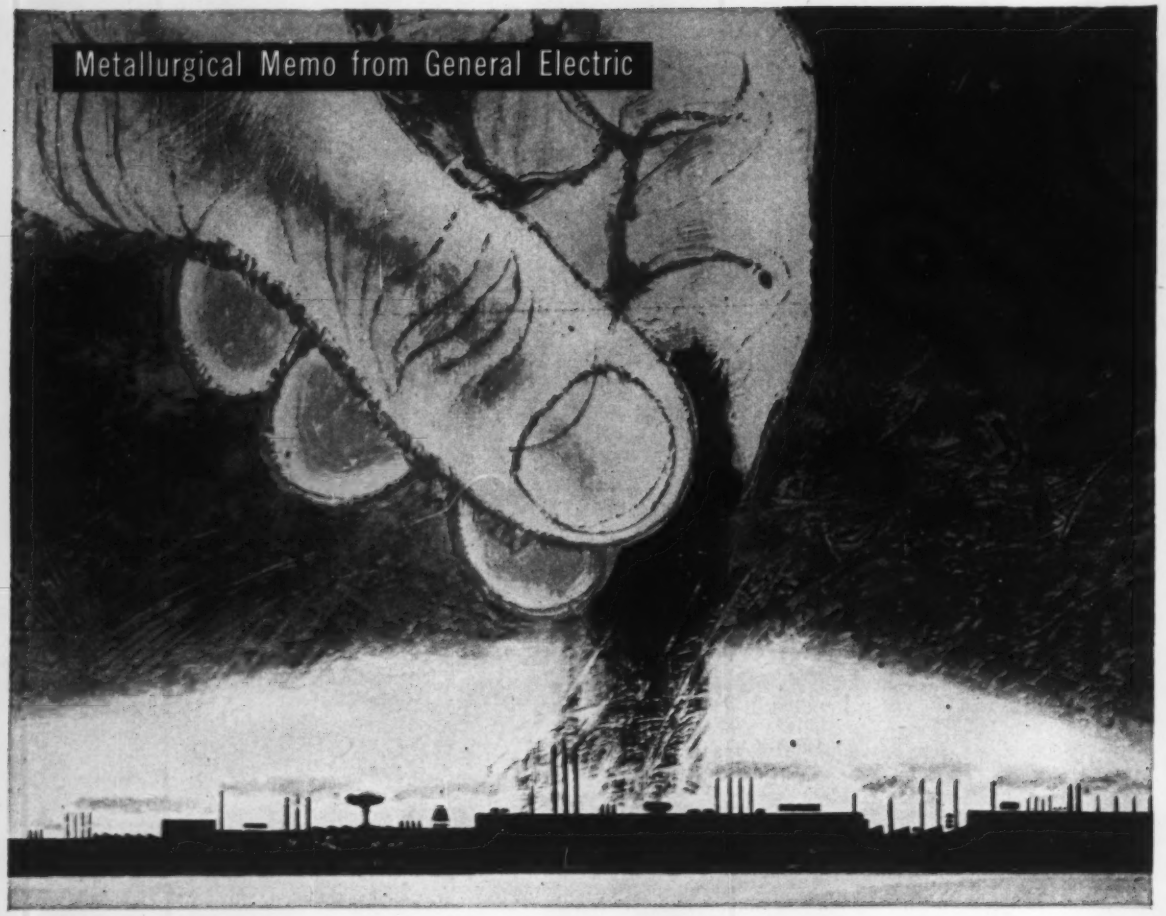
EYELET,
SLITTER
& WIRE
MACHINERY



ROLLING MILL
MACHINERY

THE WATERBURY FARREL FOUNDRY & MACHINE CO.
DIVISION OF TEXTRON INC.
Waterbury, Connecticut • U.S.A.
Sales Offices: Chicago • Cleveland • Los Angeles • Millburn, N. J.

WF 55



260 ways to "package" a pinch of powder

Metallurgical Products Department reports on a line of 260 locally-stocked Carboloy® cemented carbide inserts that slashes inventory and special-order costs

Carboloy cemented carbides start as metal powders – end as man-made metals in a variety of disposable inserts *unmatched* in the industry.

And that's where you save with Carboloy cemented carbides. You choose from 260 different inserts – 11 styles – 7 cutting grades – in any size, thickness, radius, or shape you need. You get an insert that's almost tailor-made for your particular job without costly special-ordering; and you get it *fast*, from a *local* distributor who carries your inventory *for you*.

All Carboloy cutting tools are stocked by your local Authorized Carboloy Distributor. Call him (see the Yellow Pages, under "Carbides"); or write: *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Ave., Detroit 32, Michigan.*

METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

Big Expansion by Utilities Will Boost Metalworking Sales

NEARLY $5 BILLION will be spent this year by the electric power industry to keep pace with the increased requirements of its customers. About 14.4 million kilowatts of capacity will be added this year, estimates Edison Electric Institute, New York.

Detroit Edison Co.'s construction program for expansion of its electric power system and related facilities is typical for the industry as a whole. This utility estimates the cost of its 1959 project at $68 million. It is part of a long range plan projected through 1963 and evaluated at more than $300 million, or an average of about $60 million annually.

A large share of the industry's expenditures goes directly to metalworking companies. Detroit Edison's 1959 program, as outlined by W. L. Cisler, president, will include these major construction items: Completion of a fifth generating unit and continuation of work on a sixth turbine-generator at the St. Clair powerplant; construction of eight new substations and installation of more than 500 miles of transmission, subtransmission, and distribution lines for utilization of increased generating capacity from the St. Clair and River Rouge plants; extension of steam capacity and addition of electric power generating equipment at the Beacon heating plant; and continuation of construction work on the electric power generating plant which it will operate on steam produced by the nuclear reactor section of the Enrico Fermi Atomic Powerplant near Monroe, Mich. The Fermi plant is scheduled for initial nuclear operation in late 1960. Operation at 100,000 kw is expected by the end of 1961.

New York Firms Form Pool

A small business production pool has been formed by four firms on Long Island, New York. Electrodyne Industries Inc., 393 Sunrise Highway, Lynbrook, N. Y., will seek government contracts for the pool for the production of electronic devices. The four firms are: Holden-Massey Corp., 144 Allen Blvd., and Republic Electronic Industries Corp., 111 Gazza Blvd., Farmingdale, N. Y.; Microtran Co. Inc., 145 E. Mineola Ave., Valley Stream, N. Y.; and Paromal Products Inc., 140 E. Merrick Rd., Freeport, N. Y. The pool's proposed operations have been approved by the Small Business Administration, Washington.

To Refine Special Metals

Wah Chang Corp. will install an electron beam furnace at its Albany, Oreg., plant to melt, refine, and cast special metals. It is being built by Stauffer-Temescal Co., Richmond, Calif. The furnace will be capable of the continuous melting and casting of high purity ingots (6 in. in diameter and 4 ft long) of such refractory metals as columbium.

Burroughs Corp. To Build

Burroughs Corp., Detroit, will construct a $2 million engineering and administration building at its Tireman Avenue military electronic computer plant. This will bring the total operational space at Tireman to 450,000 sq ft. Edward W. Schening is plant manager for the operation.

Industrial Firms Renamed

Northrop Aircraft Inc., Beverly Hills, Calif., changed its name to Northrop Corp. The company's Northrop Div. at Hawthorne, Calif., changed its name to Norair.

Monarch Aircraft Sales Inc., Huntington Park, Calif., changed its name to Bearing Inspection Inc. The firm specializes in bearing inspection service and equipment for the aircraft and missile industries.

Brown Thermal Development Co., Elyria, Ohio, changed its name to Brown Thermal Products Corp. The firm develops, engineers, manufactures, markets, and services heat transfer products used by the metalworking industries.

Jeta Metal Fabricators Inc., Yonkers, N. Y., changed its name to Jeta Inc. It is a metal fabricating and electric generator manufacturing firm.

Marotta Valve Expands

Marotta Valve Corp., Boonton, N. J., added 20,000 sq ft to its plant. The firm makes valves and regulators for use in aircraft, missiles, rockets, and industrial products.

Yuba Forms Erector Unit

Yuba Consolidated Industries Inc., San Francisco, formed a new division, Yuba Consolidated Erectors Inc., to perform on a national basis all field erection work for Yuba's heavy steel fabricating divisions. J. Philip Murphy is president of the division; Francis J. Murphy, vice president and general manager.

Opens Bearing Warehouse

Berry Bearing Co., Chicago, opened a stock carrying branch at 323 S. Lewis Ave., Waukegan, Ill. The firm distributes bearings, bearing specialties, and transmission appliances.

Sells Interest in McGraw

Olin Mathieson Chemical Corp., New York, has sold its interest in F. H. McGraw & Co. This transaction completes Olin Mathieson's program for disposing of operations and interests that are not related to its growth plans for its six operating divisions: Chemicals, Metals, Pharmaceuticals, Packaging, Energy, and Sporting Arms & Ammunition.

GE Realigns Departments

General Electric Co., Schenectady, N. Y., transferred the headquarters of its Chemical & Metallurgical Div. from Pittsfield, Mass., to 1285 Boston Ave., Bridgeport, Conn. These departments have been assigned to the division: Conduit Products, Wire & Cable, and Wiring Device. Robert L. Gibson is vice president of the company and general manager of the division. These operating units con-

(*Please turn to Page* 128)

Lionel gets finer finishes with Gulfcut . . . prevents metal

GULF MAKES THINGS

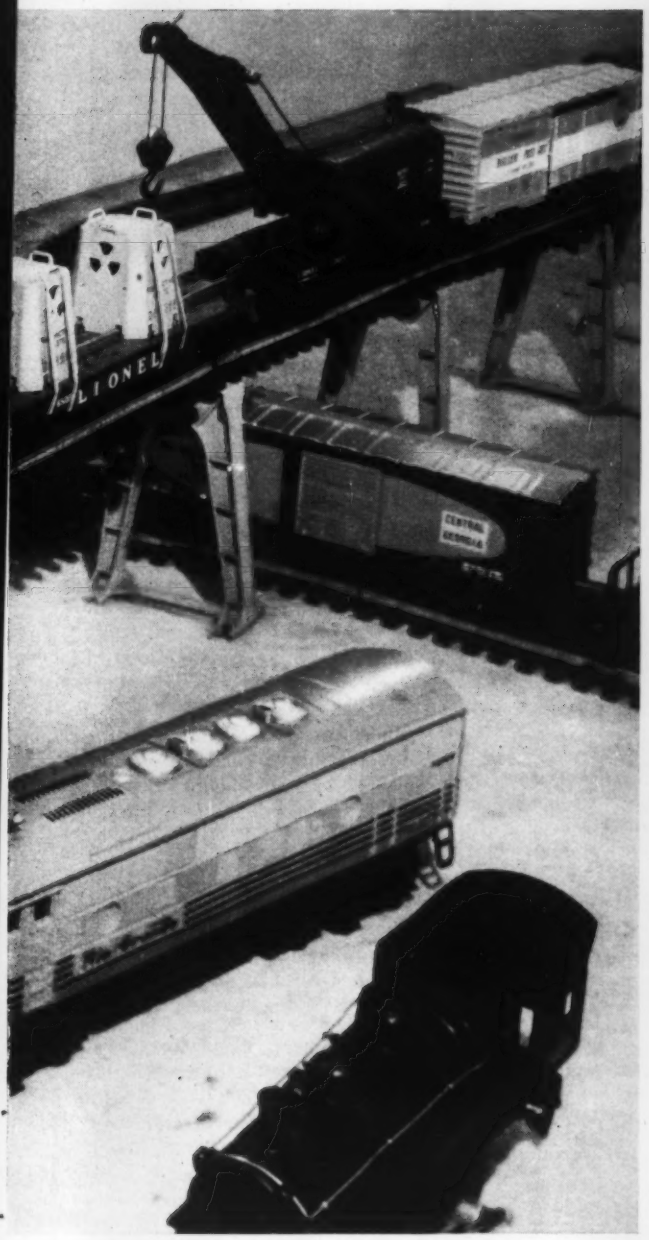
Top calibre machining, use of the right cutting oils, and a rigid inspection system are three big reasons for the high quality of the famous toy trains made by Lionel Corporation, Irvington, New Jersey.

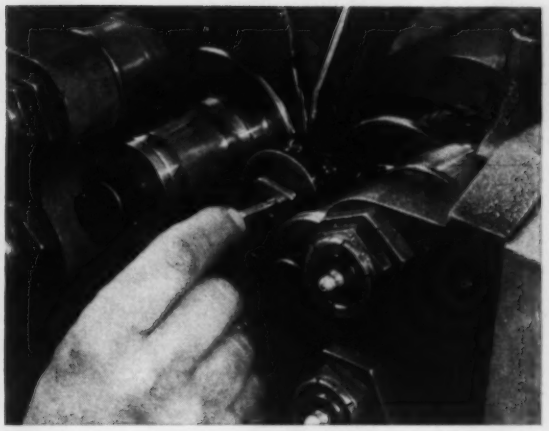
Lionel engineers have found that Gulfcut 31C is the right oil for a great variety of their cutting operations. One in particular stands out—rolling a triple thread on a worm gear shaft for toy locomotives.

Lionel used to cut these gear shafts with a hobber, but decided on the rolling method to increase production and improve finish. For the coolant-lubricant they chose Gulfcut 31C, an oil that meets all the tough requirements of thread-rolling.

Gulfcut 31C has such outstanding anti-weld properties that metal seizure is never a problem in this operation.

Lionel is now producing these gear shafts 5 times faster than with the cutting method. Gulfcut 31C helps them get finer finishes on these shafts and on other machined products, including such diversified items as fishing reels and fuse casings for the Air Force.





Reed Thread Roller at Lionel plant, where Gulfcut 31C is the coolant-lubricant in the machining of worm gear shafts. Triple thread is rolled on a ½" shaft of SAE 1010 Steel.

Sizing up the finished product are Jacques Schindler, right, Gulf Sales Representative, and Thomas Pagano, Chief Engineer, Lionel Corporation.

Wonderful way to run a railroad. Lionel insures top performance in its toy locomotives with high quality machined parts. Gets finer finishes on gear shafts by machining with Gulfcut.

seizing in thread rolling operations...

RUN BETTER!

How about your machining operations? In the complete Gulfcut line, there's a cutting oil to meet your every need. For information just call a Gulf Sales Engineer at your nearest Gulf office. Or mail coupon for illustrated bulletins.

GULF OIL CORPORATION
Dept. DM, Gulf Building
Pittsburgh 30, Pa.

GULF

GULF OIL CORPORATION
Dept. DM, Gulf Building, Pittsburgh 30, Pa.

Send me more information on: ☐ Gulfcut "Regular" Cutting Oils. ☐ Gulfcut Heavy Duty Soluble Oil.

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____

SM-3237

OSBORN

BEFORE BRUSHING

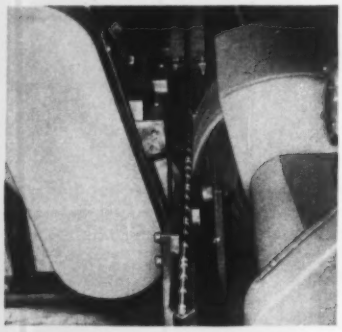
Magnified section of hardened steel hydraulic control valve. After machining, sharp edges and fine grinding burrs still remain—interfering with efficient long-life valve performance.

AFTER BRUSHING

Valve edges are precision blended . . . each radius microfinished to .002" tolerances. Burrs are thoroughly removed at the same time. Osborn Centerless Power Brushing does the job rapidly, economically . . . assures increased, troublefree hydraulic valve life.

Microfinishing valve edges to a .002" radius

. . . at rates of 1200 parts-per-hour with OSBORN Power Brushing



CENTERLESS BRUSHING SETUP precision finishes hydraulic control valves at production rates of 1200 parts-per-hour. Finish blend on valve edges can be controlled to any desired microinch tolerance. Job is done on a centerless machine—with Osborn Matic® Centerless Brushes operating at 1750 rpm.

HYDRAULIC component manufacturers today—producing parts like this control valve—require ultra-high degrees of precision finishing. And Osborn Power Brushing helps meet the demands of modern high-pressure hydraulics with quality finishing, deburring and surface blending methods for hundreds of different types of parts.

In addition to the versatility and *precise quality control* afforded by Osborn Power Brushing methods—leading manufacturers also find that finishing operations are done more rapidly . . . at significantly lower cost.

An **O**sborn **B**rushing **A**nalysis—made in your plant at no cost or obligation—can pinpoint where you can speed production . . . improve quality . . . cut costs with modern Osborn Power Brushing. Write us for full details. *The Osborn Manufacturing Company, Dept. S-3, Cleveland 14, O.*

Osborn Brushes

BRUSHING MACHINES • BRUSHING METHODS
POWER, PAINT AND MAINTENANCE BRUSHES • FOUNDRY PRODUCTION MACHINERY

(*Concluded from Page 125*)

tinue to be a part of the Chemical & Metallurgical Div.: Chemical Materials Dept., Pittsfield, Mass.; Laminated Products Dept., Coshocton, Ohio; Silicone Products Dept., Waterford, N. Y.; Metallurgical Products Dept., Detroit; Plastics Dept., Decatur, Ill.; and Insulating Materials Dept., Schenectady.

CONSOLIDATIONS

Penn Machine Co., Johnstown, Pa., acquired **Canton Malleable Iron Co.**, Canton, Ohio, maker of malleable iron, alloy steel, aluminum, brass, and bronze castings. Also acquired in the transaction is a wholly owned subsidiary, Canton Mfg. Co. which acts as sales agent for the parent company's specialty items, including chain load binders, and vertical exhaust protectors.

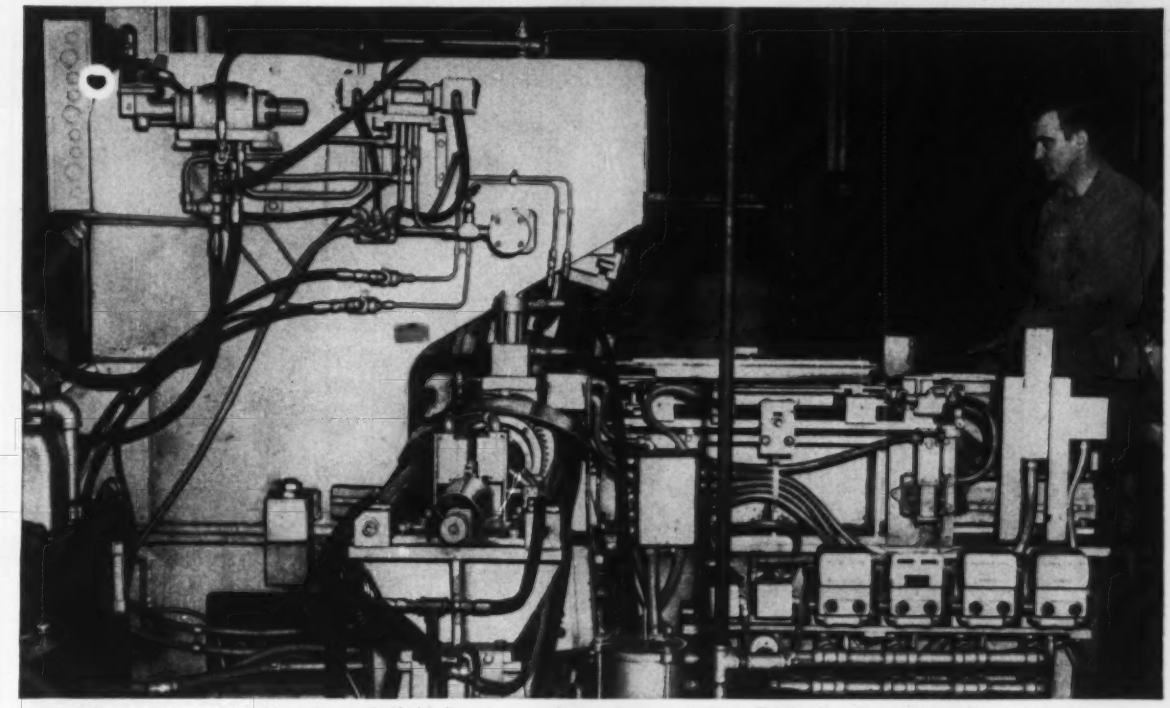
Officers of Canton Malleable include: President, Richard Wright; executive vice president, Leo B. Kelly Jr.; vice president in charge of operations, C. T. Taggart; vice presidents, J. T. Dougherty and W. T. Cole.

Eaton Mfg. Co., Cleveland, completed acquisition of **Cleveland Worm & Gear Co.** and its subsidiary, **Farval Corp.**, Cleveland.

Allis-Chalmers Mfg. Co., Milwaukee, purchased **S. Morgan Smith Co.**, York, Pa., which will operate A-C's newly created Hydraulic Div. within the Industries Group. Joseph L. Singleton is vice president, Industries Group. The Hydraulics Div. will fabricate hydraulic turbines and accessories, pumps and pump-turbines, and valves. B. E. Smith is general manager of the Hydraulic Div., York Works.

Allis-Chalmers has also formed a Nuclear Power Dept. within its Atomic Energy Div. C. R. Braun is department manager.

H. K. Porter Company Inc., Pittsburgh, acquired **National Electric Products Corp.**, Ambridge, Pa., and will operate it as a division. National Electric makes steel conduit, boxes and fittings, building wires and cables, high voltage cables, and underfloor raceway sys-



This machine rolls and welds muffler shells. Hydraulic pressure and return lines are Aeroquip Flexible Hose Lines which replaced rigid tubing.

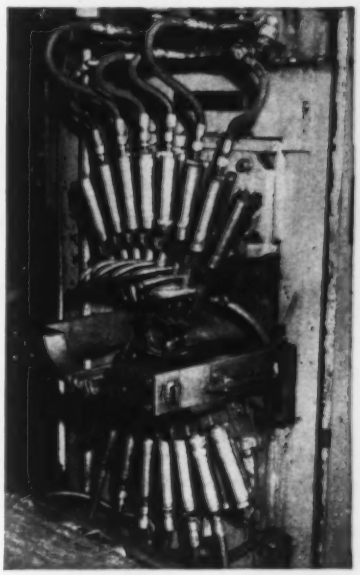
Hydraulic Line Leakage Problems Solved With Aeroquip Flexible Hose Lines

at Walker Michigan Division,
Walker Manufacturing Company of Wisconsin

Semi-automatic metal forming and welding equipment is used at Walker Michigan Division's Jackson plant in the production of automotive mufflers. On equipment using rigid tubing, leaking hydraulic lines were a common maintenance problem. Tubing failures were caused by vibration of the equipment during operation.

Walker maintenance men solved this problem by replacing rigid tubing with Aeroquip Flexible Hose Lines. Assembled quickly in the plant using Bulk Hose and Reusable Fittings, these replacement hose lines have given long, trouble-free service.

If you have a fluid line problem of any kind, you can rely on your local Aeroquip Distributor to help solve it. He's a fluid line specialist. Call him today, or write us.



Aeroquip Hose Lines on this multiple transformer welder have given long, leakproof service since replacing steel tubing. Walker maintenance men keep a supply of Aeroquip Hose and Reusable Fittings on hand to replace tubing when needed.

Aeroquip

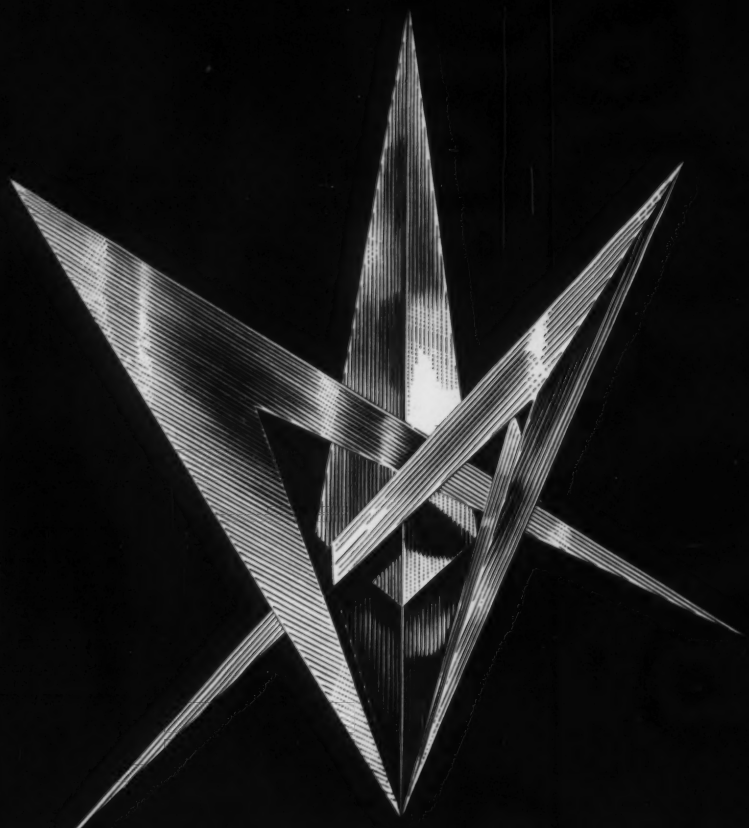
REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

INDUSTRIAL DIVISION, VAN WERT, OHIO • WESTERN DIVISION, BURBANK, CALIFORNIA
AEROQUIP (CANADA) LTD., TORONTO 19, ONTARIO

AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

For Economy and Ease of Maintenance, Specify Aeroquip Reusable Fitting Hose Lines on New Equipment you Buy.



QUALITY
IN STAINLESS STEEL

"FLIGHT OF PROGRESS"
a stainless steel sculpture by Robert Edward Hamilton

Quality in stainless steel starts in the melt shop, where Industry Standards are met – *or missed.*

1 out of every 7 tons of stainless used in the last 15 years came from the melt shop of J&L's Stainless and Strip Division. To achieve that remarkable record as a supplier of semi-finished products, J&L set up its own standards and specifications – far more exact, more precise, *more rigid* than those in general use. Today J&L leads the industry in melting practice standards – the point where quality starts.

Chances are 1 out of 7 you have already enjoyed J&L quality in stainless, without knowing its melt shop origin. Now you can eliminate chance! Newly installed cold rolling and finishing equipment in operation at Louisville, Ohio, makes J&L the most modern *integrated* source for *finished mill products* – stainless sheet, strip, bar and wire. All of traditional J&L stainless quality.

On your next stainless steel order specify "J&L *Consistent* Quality." Don't pay for less.

Plants and Service Centers:
Los Angeles • Kenilworth (N. J.) • Youngstown • Louisville (Ohio) • Indianapolis • Detroit

STAINLESS
SHEET • STRIP • BAR • WIRE

Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Box 4606, Detroit 34

tems. Robert F. Bennett Jr. is general manager of the division.

A. P. Green Fire Brick Co., Mexico, Mo., acquired **Climax Fire Brick Co.**, Climax, Pa. Principal products of Climax are Pennsylvania type of fire clay refractories.

Koehring Co., Milwaukee, purchased **Cast-Master Inc.**, Bedford, Ohio, manufacturer of diecasting machinery. Koehring plans to operate the Bedford plant as a division of its Hydraulic Press Mfg. Div., Mt. Gilead, Ohio.

NEW ADDRESSES

Carpenter Steel Co., Union, N. J., moved the western regional sales headquarters of its Alloy Tube Div. from San Francisco to 2304 Huntington Dr., San Marino, Los Angeles, Calif. Harry L. Harner is western regional sales manager.

Edward Valves Inc. and **Republic Flow Meters Co.**, both subsidiaries of Rockwell Mfg. Co., Pittsburgh, have consolidated their offices with other Rockwell offices at 1495 Northside Dr. N.W., Atlanta, Ga.

Berry Steel Corp., **Ardmore Products Inc.**, and **Kenilworth Steel Co.** consolidated their plants and offices at Aldene and First Avenues, Roselle, N. J.

Caswell, Strauss & Co. Inc. moved to Sewaren, N. J. The firm will occupy three buildings leased from Vulcan Detinning Co. The company smelts and refines nonferrous metals and makes solder metals, babbitt, tin, and lead products.

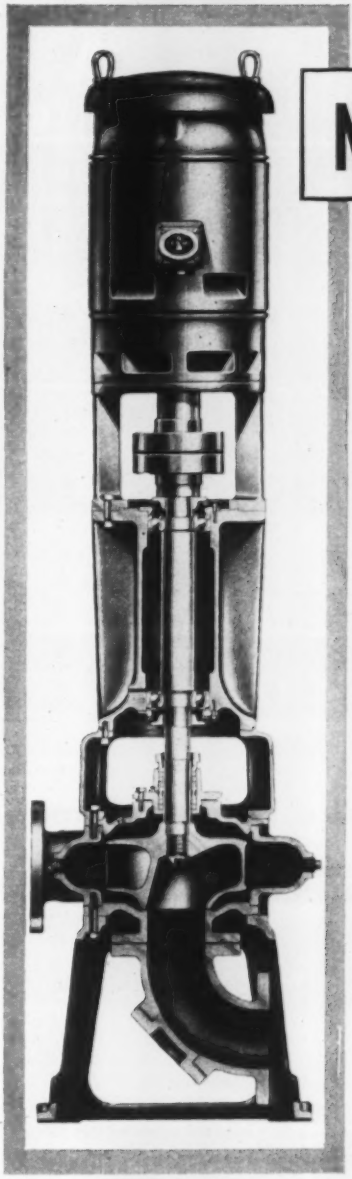
Bernard C. Day, district manager of the Ohio area for **Bryant Chucking Grinder Co.**, Springfield, Vt., moved his office to the Ex-Cell-O sales offices in the Penton Bldg., 1213 W. Third St., Cleveland 13, Ohio.

J. O. Ross Engineering Div., Midland-Ross Corp., New York, moved its Chicago offices into the company's new suburban building at 370 S. School St., Mt. Prospect, Ill. **Hartig Extruder Div.** and the **John Waldron Corp.**, a Midland-Ross subsidiary, also moved their

(*Please turn to Page* 134)

For higher pumping efficiency

of solids in suspension!



NEW

Fairbanks-Morse

5440A Non-Clog Pumps

Ideal for pumping unscreened liquids with large solids in suspension

- **industrial wastes**
- **sanitary sewage disposal**
- **industrial processes**

Here is your answer to higher efficiencies wherever you are pumping solids in suspension!

All-new Fairbanks-Morse 5440A Non-Clog Pumps feature quick, easy convertibility between any of the many vertical and horizontal types. Power requirements of the pump are always perfectly matched to the electrical and mechanical components. Precision-machined centering fits assure accurate alignment. Exclusive F-M bladeless impeller design minimizes maintenance by preventing clogging from solids and stringy material. The 5440A is only one of many F-M solids-handling pumps designed to meet a broad range of requirements. For information, write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

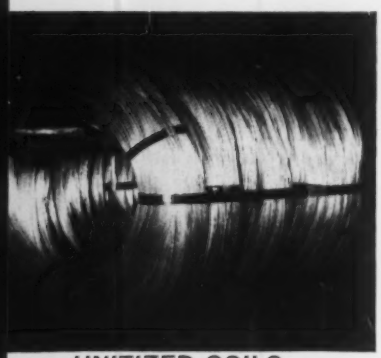
Ask for new 5440A BULLETIN!

FAIRBANKS-MORSE

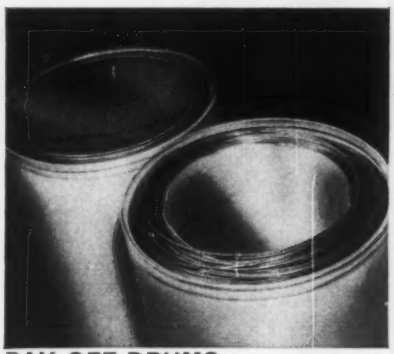
a name worth remembering when you want the BEST

ELECTRIC MOTORS • DIESEL, DUAL FUEL AND GAS ENGINES • PUMPS
COMPRESSORS • GENERATORS • MAGNETOS • HOME WATER SYSTEMS

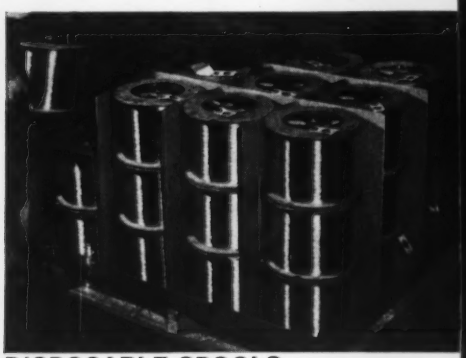
Other new AS&W Wire Packages mean important savings in



UNITIZED COILS:
Several regular mill coils bound in one unit to speed up handling and save storage space. Unitized coils carry no price extra!



PAY-OFF DRUMS:
Large, fibre, disposable carton containing long continuous wire coil. Pay-Off Drum is easy to handle and stack, protects wire finish from dirt and corrosive atmospheres.



DISPOSABLE SPOOLS:
Contain up to 65 pounds of fine wire; are shipped on expendable pallets. These non-returnable spools are convenient to handle and stack.

WEIGHT WIRE COILS

save you down time...

handling time...storage space

...at no increase in cost!

If your mill machines are set up to run with these continuous-wire, heavy-duty coils, they will pay off for you in three ways:

They will speed up your production by eliminating unnecessary down time, unnecessary idling of operators and machines.

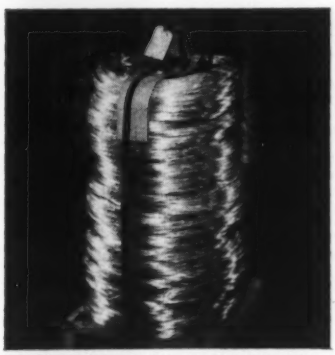
They will save handling time. One large coil can be handled in a fraction of the time needed to move the same weight in smaller coils.

They save storage space. This big coil takes up far less space than the same weight in smaller coils.

And you get all these advantages as standard mill practice. *USS and American are registered trademarks*

USS **American Manufacturers Wire**

time and storage!



PLATFORM COIL CARRIER: This non-returnable unit is made of U-shaped wire frame attached to deck platform, holds up to 3,000 pounds of wire in continuous lengths.

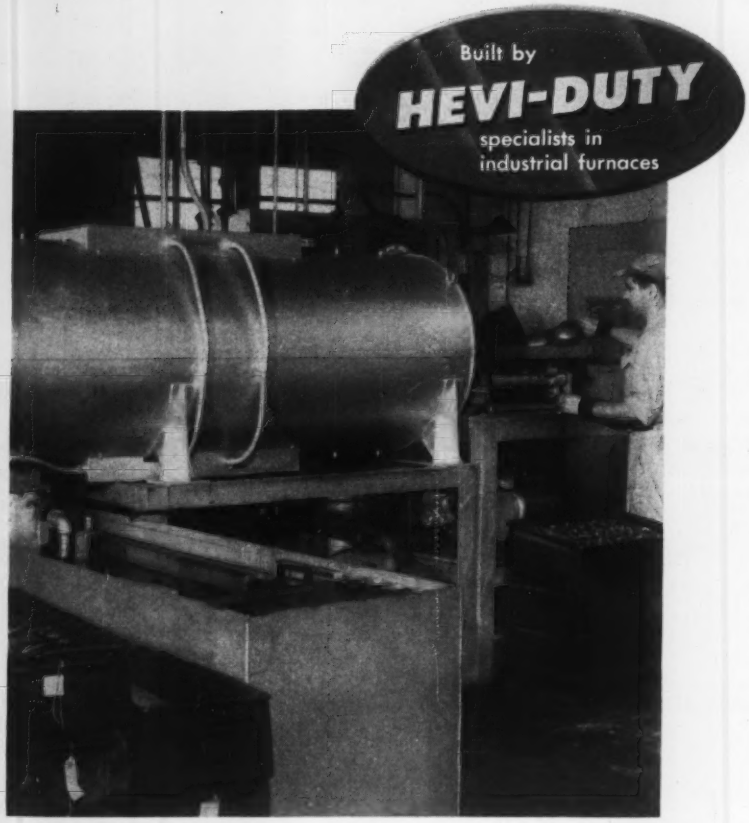
All of these new American Steel & Wire Packages are planned to serve you better, to help you use warehouse space to better advantage, to save time and money.

For more information, get in touch with the nearest district office of American Steel & Wire. General Offices: American Steel & Wire, 614 Superior Avenue, N.W., Cleveland 13, Ohio.

American Steel & Wire
Division of
United States Steel

USS

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad



Talk about performance... production tripled... rejects eliminated ...operating costs cut 50 percent

This is the kind of performance Fred Heinzelman & Sons, New York's oldest heat treat shop, likes to talk about. Carl Heinzelman says, "We like the operating simplicity of our Hevi-Duty Shaker Hearth Furnace as well as its excellent temperature uniformity. The uniform quality of the work it turns out has eliminated rejects."

But improved quality is only half the story. Parts are fed onto the hearth and progress through heat and quench cycles automatically. This eliminates jig and wire time and enables them to step up production from 20 lb an hour to 60 lb an hour. At the same time, operating costs per unit of production have been cut in half.

Parts processed in this furnace are springs, washers and screw machine parts. They are treated under protective atmosphere at temperatures varying from 1450° F. to 1850° F. and quenched in oil. All parts come out at maximum hardness for each metal.

For more information on the performance of Hevi-Duty Shaker Hearth Furnaces, write for Bulletin 1057.

- Industrial Furnaces electric and fuel
- Laboratory Furnaces
- Dry Type Transformers
- Constant Current Regulators

HEVI-DUTY ELECTRIC CO.
Milwaukee 1, Wisconsin

(*Concluded from Page 131*)

Chicago offices into the building. The engineering division is headed by Leslie Janett, vice president and Chicago general manager.

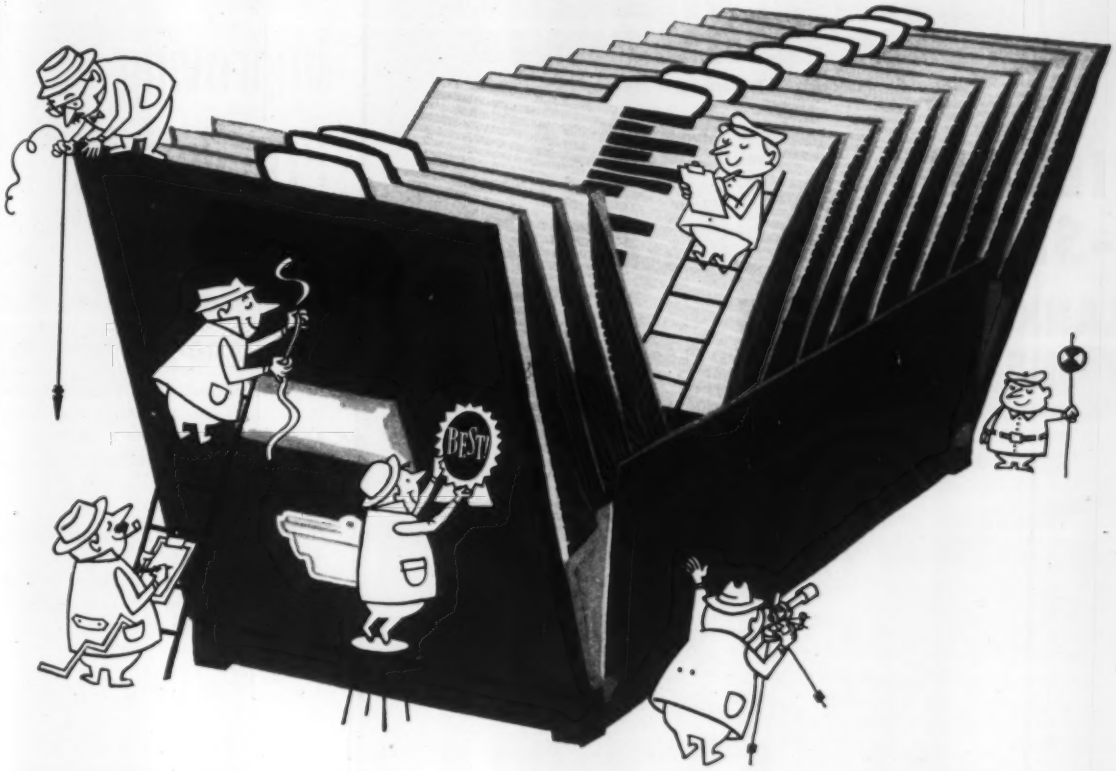
McGregor-Michigan Corp. moved its offices to 13360 Helen Ave., Detroit 12, Mich.

ASSOCIATIONS

Powder Metallurgy Parts Manufacturers Association, Pittsburgh, elected these officers: President, K. M. Gleszer, Dixon Sintaloy Inc., Stamford, Conn.; first vice president, M. T. Victor, International Powder Metallurgy Co., Ridgway, Pa.; and treasurer, Smith Bolton, U. S. Graphite Co., a division of Wickes Corp., Saginaw, Mich. Hanson & Shea Inc., Pittsburgh, is the managing director.

Permanent Magnet Producers' Association has been organized with headquarters at 27 E. Monroe St., Chicago 3, Ill. Officers include: President, R. J. Studders, Magnetic Materials Section, General Electric Co., Edmore, Mich.; vice president, W. G. Scharnberger, Crucible Steel Co. of America, Harrison, N. J.; treasurer, W. E. Gilman, General Magnetics Corp., Chicago; and executive secretary, Harry Dolan.

Aluminum Association, New York, elected these officers: President, M. M. Anderson, Aluminum Co. of America, Pittsburgh; chairman, S. D. Den Uyl, Bohn Aluminum & Brass Corp., Detroit; vice presidents, J. W. Douglas, Republic Foil & Metal Mills Inc., Danbury, Conn., T. D. Gebhart, Anaconda Aluminum Co., Louisville, and F. A. Merliss, United Smelting & Aluminum Co. Inc., New Haven, Conn. Chairmen of the divisions are: Extruded Products Div., W. E. Dunlap, Aluminum Extrusions Inc., Charlotte, Mich.; Aluminum Sheet Div., R. T. Farrell, Fairmont Aluminum Co., Fairmont, W. Va.; Aluminum Rolled Bar & Rod, & Wire Div., D. B. Miller, Aluminum Co. of America; Aluminum Foil Div., J. H. Konigsberg, Revere Copper & Brass Inc., New York; and Aluminum Foundry Div., J. E. Fahlman, Permold Co., Medina, Ohio.



BEST!

...SAYS MAJOR U. S. INDUSTRIAL FIRM* ABOUT

KOLECT-A-MATIC®

VISIBLE SYSTEM FOR TOOL CRIB CONTROL

Industry's Survey Finds KOLECT-A-MATIC System Operates Faster—In 65% Less Space—At 35% Lower Cost—Than *Any Other* Tool Crib Control System Known!

It's a fact – one of America's leading industrial firms felt the need for effective tool crib control to be of such importance that they assigned a group of industrial engineers to survey *all* existing systems. Their task – to select the best.

Studies included a complete investigation of the REMINGTON RAND KOLECT-A-MATIC system and equipment. So impressed were these engineers with this compact efficient method that they visited Kolect-A-Matic installations throughout the country. Their report – KOLECT-A-MATIC Visible Records System, the most practical for any future installations of Tool Crib Control.

If your present Tool Crib Control System is hanging on the wall – taking up valuable space – wasting valuable time and costing you more than it should – you owe it to yourself to look into all the saving advantages of the complete control offered by KOLECT-A-MATIC Visible Records System. Send the coupon today.

*Name on request

Remington Rand

DIVISION OF SPERRY RAND CORPORATION

Room 1234, 315 Fourth Ave., N. Y. 10

Please send FREE folder "Simplify Tool Crib Operations With Remington Rand Visible Controls and Equipment" (KD844)

NAME & TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

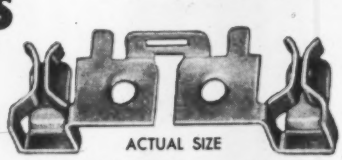
Blanking, Piercing and Preforming in Press

NILSON 4-SLIDE

BLANKS *and* FORMS IN ONE CYCLE!

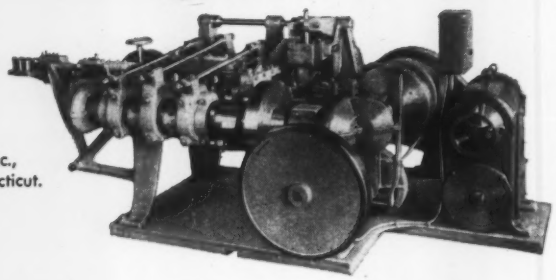
Cutoff

Partial Forming with Slides



ACTUAL SIZE

Final Forming with Slides



MANUFACTURER:
Harvey Hubbell, Inc.,
Bridgeport, Connecticut.

PRODUCT:
Contact Spring.

PRODUCTION:
136 Parts Per Minute.

Nilson 4-Slide Machine with Built-in Press

Harvey Hubbell shifted production of this part from a conventional press and progressive dies to a Nilson 4-Slide with built-in press. The immediate results: elimination of two secondary operations . . . simpler die . . . higher production rate . . . no stripping problems.

Harvey Hubbell also found that vertical mounting of die makes replacement easy . . . permits automatic disposal of scrap by gravity. And maintenance costs are incredibly low—this machine has been operating for twelve years without major repairs!

Nilson builds 7 models of ribbon metal forming machines, with built-in press sections ranging from 5 to 75 tons capacity. One of these machines may help you bring your stamping methods up-to-date!

Write today for the Nilson General Catalog on Automatic 4-Slide Equipment.

NILSON
THE A. H. NILSON MACHINE CO.
605 Bridgeport Avenue • Shelton, Conn.

AUTOMATIC WIRE & RIBBON METAL FORMING 4-SLIDE MACHINES • WIRE & STOCK REELS • WIRE STRAIGHTENING EQUIPMENT • AUTOMATIC STAPLE FORMING MACHINES • SPECIAL WIRE FORMING EQUIPMENT

Coming Mar. 16

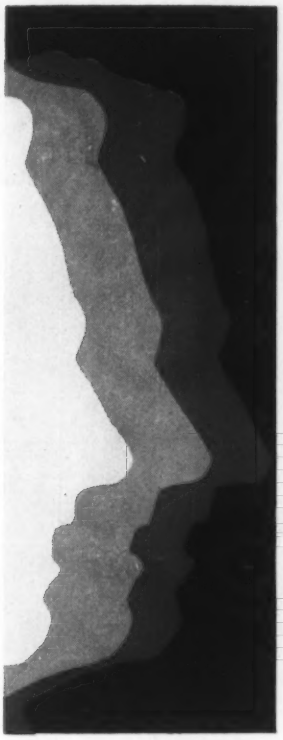
Improving Productivity

During the soaring '60s and '70s, managers will have to play the role of productivity experts as they have never played it before. Managers have done amazingly well in adapting to and solving new problems. But they haven't solved inflation.

Here's what happens when productivity improves faster than wages: Productivity jumped 6.6 per cent per year from 1919 through 1928, when wages rose only 1.8 per cent annually. As a result, prices dropped 3 per cent each year. Productivity went up 1.7 per cent a year from 1929 through 1938, and wages rose only 1.1 per cent each 12 months. Prices dipped 1.8 per cent annually, as a consequence. But from 1939 through 1946, productivity rose only 0.1 per cent yearly, while wages jumped 9.2 per cent every year. The result was the worst inflation of the century. Prices rose 5.6 per cent a year. The 1947-56 decade was also on the debit side, with prices climbing 2.8 per cent per year as productivity rose 3.9 per cent and wages climbed 6 per cent annually.

The next article in STEEL's 1959 Program for Management will show how this situation has led to inflation and how productivity can be improved.

An extra copy of these Program for Management articles is available until the supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



Profile of Metalworking's Managers

• THERE ARE FEW lonely presidents at the end of the hallowed hall these days.

Twenty-five years ago it was a different story. The president alone had to decide whether to add a new product line (he probably conceived and developed the idea, too) . . . whether to install a new production line . . . which companies were to be his major suppliers of materials and components.

But he couldn't keep up. Technology advanced too rapidly. Business became too complex. He needed people who could participate in and share his decision making responsibilities. The breach has been filled by middle managers, the new elite corps of metalworking management.

This changing role of the metalworking manager is one of the distinctive features of our dynamic industry. Authority and its opposite member, responsibility, are being decentralized. The trend will accelerate as technology and the economy rocket to new heights.

The challenge to you, as a member of middle management, is to recognize and keep pace with your changing role.

The point gains significance when you trace the development and increasing importance of your function. Some of you won't have to dig too deeply because your function is pretty new. For example: Wage and salary administrator, value analyst, marketing manager, safety engineer, manager of work simplification, customer relations manager. A complete list could fill the rest of this page.

Let's take a look at one of the new functions—the marketing manager.

The Marketing Team

Marketing and selling used to be synonymous. It was logical for the sales manager to gravitate toward his counterparts in engineering and manufacturing. New products were generated largely through the in-

Guiding the changing roles . . .

"KEEPING HIS management organization tuned to the times is a key role of a chief executive," stresses George Spatta, president of Clark Equipment Co.

"Advancing technology and increasing business complexity are a big factor in a president's need for specialists. But company growth has an even greater impact upon his reliance on them."

Mr. Spatta is frequently accused of executive pirating. "It's true," he admits. "But we have not been able to build a company university like General Electric (he received his early training at GE)." Clark's sales have grown from $38.2 milion in 1946 to a peak $143 million in 1957. Sales targets for 1959 exceed $175 million.

"I believe in paying good salaries to get topnotch executives—I demand top performance in return," relates Clark's president.

In addition to division managers, Mr. Spatta has eight staff executives reporting to him. "They're the experts," he points out. "While each division has autonomy, I rely on the staff people to co-ordinate their respective functions on a company-wide basis for maximum efficiency—they're the watchdogs."

A manager grows with a changing role . . .

YOU DON'T measure the role of a manager by the number of people reporting to him or the number of functions he's responsible for.

John Arndt, works manager for Charles Bruning Co. Inc., is a typical manager who has grown with his company. Born in Hungary, he gained most of his education there, but supplemented it by attending night school for six years after coming to this country.

His climb up the management ladder included sales and service activities, plus researchwork on Bruning's Copyflex equipment. In 1942, he became manager of machine manufacturing. His responsibilities ran the gamut: Production, quality control, industrial engineering, even some recruiting and hiring of personnel.

Bruning's growth from sales of $14.7 million in 1950 to $38.3 million in 1957—necessitated reorganization of its management structure along functional lines.

Mr. Arndt was promoted to works manager. People who report to him include the production managers of the machinery and paper coating divisions, chief industrial engineer, office manager, services manager, and national warehouse center manager.

Engineer with a diplomatic role . . .

IF ASBESTOS pants were tailored with a manager in mind, it was probably the senior project engineer in the auto industry. This hardy individual is both highly skilled technician and diplomat.

Ideas for new products or components generally originate from studies on consumer demands. The project engineer, says Bruce Edsall, staff engineer for transmissions, axles, propeller shafts, and brakes at GM's Cadillac Motor Car Div., must translate ideas into specifications and a design. Then he must set up a method to produce it, build a prototype and test it, and develop final production line methods. All steps are on a tight cost and time schedule. That's the technician side.

To get his job done, he must use the tactics of a diplomat—pushing, pulling, compromising, and selling. He works with engineering advisory groups, laboratory and testing units, sales and service departments, purchasing, manufacturing, and outside venders. He not only engineers a product, but a compromise which appears in the final automobile.

Mr. Edsall tends to share with other administrators this opinion of project engineers: They have more responsibility than anyone else in the engineering profession.

New recognition of the purchasing role . . .

A function with expanding roles . . .

YESTERDAY'S purchasing agent was hardly a full notch above a high priced clerk. He handled requisitions from department heads who told him what to buy and where.

Today's PA is a professional. Bertil G. Erikson, purchasing agent for Signode Steel Strapping Co., is an example. He directs a staff of nine and purchases for Signode's five plants. He's a key member of the steel inventory committee whose members include the vice president of manufacturing, market research director, budget director, sales office manager, methods and production control manager.

Mr. Erikson worked in Signode's purchasing department before entering the Navy, but on his return in 1946, he entered a company training program. He relates: "I did manual labor in the plant, then switched to methods and standards time study work; financial planning and credit department duties followed. For three years, I was office manager of the sales department." In 1951, he was promoted to purchasing agent.

"The PA is a big factor in boosting company profits," he emphasizes. "If a company is making 10 per cent profit on sales, a $100 saving by purchasing is equal to a $1000 sale."

INDUSTRIAL RELATIONS got its start in the mid-1930's in response to a two-pronged need:

1. The union movement was gathering momentum. Management needed a specialist to meet the challenge.

2. Jobs were becoming more complex. Better people were needed to man them.

About that time, William A. Kissock, then a sales enginer for another company, decided to trade horses. "Moving from sales to industrial relations wasn't such a drastic move," he relates. "Both involve dealing with people. I felt that a marketing and sales approach in this challenging new field might prove effective."

Mr. Kissock is now manager of relations and utilities for Hotpoint Co., a division of General Electric Co. He has been a participant in one of managment's most dynamic functions. Industrial relations today includes many specialists: Labor relations, employment, wage and salary, safety, training and development managers.

A new role in this field that promises to expand is community and government relations, predicts Mr. Kissock. A company must be a good citizen, he asserts.

tuition of this trio—occasionally, a customer would ask for something new.

Marketing began to gain status as the wisdom of co-ordinating all activities that support sales—sales promotion, advertising, and servicing—became apparent. Marketing's realm was extended from the end of the production line to the customer.

"Now we've arrived at a new concept," says James Jewell, vice president of marketing at Westinghouse Electric Corp. "We define it as the entire organization—research, engineering, production, and marketing—working together to determine: 1. What the customer wants. 2. How best to produce it. 3. How to motivate its sale. 4. How to deliver it.

Profits from Purchasing

Purchasing is another example of an evolving function. In many firms, the dollar volume of purchased materials and components amounts to 40 to 60 per cent of sales volume. Comparison of the impact on profits of a 10 per cent sales increase and a 10 per cent saving in purchasing illustrates the PA's growing importance.

The value analysis role of the purchasing manager is getting closer attention. Because of his contacts with suppliers he's a natural for the "bird dogging" of new components, the substitution of materials, savings through redesign.

B. G. Erikson, Signode Steel Strapping's PA (see above), cites these examples from personal experience: We in purchasing felt that if the specifications on some of our containers could be changed, substantial savings would result. Working with engineering and sales departments, container tests were run. The specs on one container were lowered. Savings came to 30 per cent. In another instance, purchasing suggested the use of a new plastic product as a substitute for one of plywood. Savings: 16 per cent.

In many firms, purchasing also plays a key part in make-or-buy decisions, inventory control, traffic management, and vender relations. The PA's new role demands the close co-ordination of his activities with marketing, engineering, production, and finance. That's why

the top purchasing manager is a vice president in many firms.

More Hands Do a Better Job

The development patterns of other basic functions—manufacturing, engineering, industrial relations, and finance—are like those in marketing and purchasing. All show the same increase in complexity.

Since World War II, big, sprawling firms have found that the pulling of all operational strings from a corporate office leads to inefficiencies. Good managers on the local plant level, operating within the confines of well-planned corporate policies and objectives, can do a more effective job. Alert management has also found it advantageous to decentralize manager functions along product lines.

So manager roles change for only one reason—in response to a need within a company.

"One of the chief executive's greatest problems is the recognition and timing of that need," says George Spatta, president, Clark Equipment Co. "Until a few years ago, we had no legal staff. But with our new emphasis on new products and entry into world operations, the function became a must—so we added it. We recently established a corporate manager of engineering standards because there are substantial savings to be realized in having all our engineering activities operating under the same standards."

But comparing yesterday's organizational chart with today's portrays only the rise of the specialist. That's only half the story.

The "People Factor"

Think in terms of your job again. What's your greatest contribution to your company? Your technical skill will be high on the list; but if you're objective, your *managing ability* will be on a par with it, perhaps even higher.

Managing means dealing with people. Today's professional manager must be as proficient in getting work done through people as he is with technical problems. Peter F. Drucker underlined the challenge to today's managers at a National Industrial Conference Board session on "Human Relations: Where Do We Stand?"

Our real problem, he related, is not how to manage the rank and file manual worker. That was essentially yesterday's management problem. Today, the problem is how to manage highly educated people who contribute knowledge, who are "mind" workers. In number, these people are rapidly becoming the majority; in terms of personnel costs, they've already reached that level.

Your role as a manager must change to keep pace with the tech-

Here's the Composite of a Metalworking Manager

He's 48 years old.

He has been with his company 17½ years.

He supervises nine people directly, 150 indirectly.

He has been in his present job seven years.

He owns his home, valued at $28,000.

He's a hobbyist—fishing, golf, hunting, and photography are his favorites, in that order.

He owns two cars, a Buick and a Ford.*

He has a B.S. in mechanical engineering from the University of Michigan.**

He operates as part of the management team, determines the need for new and improved manufacturing methods, takes part in deciding on new products to be developed and marketed, specifies new material and new equipment.

He's most likely to be in administration, production, engineering, or purchasing.***

*Other cars most popular with managers (in order of preference): Chevrolet, Oldsmobile, Cadillac, Plymouth, Chrysler.

**Other universities most popular with managers (in order): Massachusetts Institute of Technology, Purdue University, Ohio State University, University of Illinois.

***More managers are in administration than any other function. Besides the four named functions, other important ones include: Product research, sales, maintenance, marketing, industrial relations, public relations, market research, and advertising.

Source: STEEL's Continuing Reader Study.

nical-specialist needs of industry, and this changing "people factor." George Odiorne, assistant director of personnel administration for General Mills Inc., sums up elements of the "people factor" this way:

"Business management cannot be reduced to a series of simple mathematical formulas. To understand management . . . we must come to terms with the man . . . his gut-reaction, his sentiments, and emotions which sustain him."

Mr. Odiorne's observation contains two suggestions for alert management: 1. The need to adjust organizational charts to accommodate the increasing number of managers required in today's business climate. 2. To provide the proper corporate climate in which these managers will function most effectively.

You're Human, Too

As a metalworking manager, you're not the calculating, heartless logician who employees once labeled the "brass." You're as human as the guy on the assembly line—you want a good salary, a chance for advancement, an opportunity to participate. Occasionally, you want the boss to tell you how you're doing. Psychologists tell us you have the same basic fear of losing your job as anyone else.

STEEL's contacts among metalworkers confirm a new awareness of the need for a better "corporate climate" to get maximum performance from its managers.

W. C. Keeran, vice president of Vapor Heating Corp., makes it a practice, for example, to know all his employees, including hourly shop people. On special occasions, such as birthdays, promotions, and births, he sends them notes of congratulation. He personally addresses cards to them. "I don't do this for morale purposes alone," he emphasizes. "I do it so I can keep track of these individuals better—how they're doing, what their goals are, who's ready for promotion when an opening occurs."

Your Chance To Score

Decentralization brightened the management climate of many firms. Pushing authority and responsibility closer to logical functional levels improved the effectiveness of most organizations. Top executives found you middle managers eager for a chance to carry the ball and do some scoring on your own.

But decentralization coupled with the tremendous growth of metalworking compounded the need for managers. Management discovered that capable technical-specialists weren't always capable managers, and vice versa.

Training became the major management need. The last 10 to 15 years have seen a tremendous upsurge in internal and external management development programs. Again, the middle and lower ranks have proved to be an excellent pool of talent.

This emphasis on management development and the upgrading of metalworking managers is just beginning to pay off. Lawrence A. Appley, president of the American Management Association, feels that the great resurgence in business predicted for the 1960s will be due in large measure to the greater competence of managers.

It's certain that competition among managers will become intense. You'll have to learn as much as possible about this new kind of manager.

STEEL magazine has made a start in this direction. It commissioned Dr. Robert Shoaf, professor of psychology at New York University, to make a clinical study of today's typical metalworking manager in administration, engineering, purchasing, and production. Among his findings were:

1. Managers make purchasing decisions on the bases of emotional as well as rational factors. While most are reluctant to admit it, managers are swayed by a salesman's personality, a company's reputation, favors, and special treatment.

2. Although managers in administration, production, purchasing, and engineering differ in function,

What the Manager Expects from His Job

1. **A GOOD SALARY**

   He's not particularly mercenary, but he views money as a symbol of acceptance and status.

2. **A CHALLENGING JOB**

   He wants specific responsibilities and authority. He wants to feel that his abilities are being fully utilized.

3. **OPPORTUNITY FOR ADVANCEMENT**

   Ambitious and competitive, he searches out the company which is growing, which emphasizes management development, which promotes on the basis of performance.

4. **WORKING CLIMATE**

   He requires a sense of belonging and participation. Two types of management (the one-man show and the political clique) are distasteful to him.

Rise of the New Foreman . . .

Thirty years ago, the foreman was master of all he surveyed. He earned his position primarily through two attributes: He could outproduce and outfight any man in the department. He hired and fired his workers. In most cases he scheduled the work and decided how and by whom it would be done. To a considerable degree, he determined pay rates, who got a raise and when.

The rug started to slip from under the old boy in the mid-thirties. The union movement began to take hold (foreman abuses of employees contributed to the cause), and specialists took on increasing importance in industry. During World War II and the postwar era, the role of specialists fanned out to keep pace with a technology advancing at a gallop.

Now the foreman is something of a problem.

"The foreman is our most neglected manager—and it's costing us money," laments a president of a big midwestern firm. "We've completely shorn him of any real authority. We've diluted his responsibilities. We've surrounded him with so many specialists that he uses them as a crutch. So what do we have left? A high priced clerk who checks to see that workers are on the job, machines are operating, materials are on hand. When a kink develops, he calls a specialist—it's easier that way. If the problem is solved, he looks good for having known where to go; if it isn't, he can pass the buck to the specialist."

That type foreman will certainly vanish. But what we shall see—and many metalworkers are already attacking the problem—will be the recreation of the *managing* foreman. Here's what's being done:

● The foreman's job is being redefined in terms of what performance he's accountable for, rather than in terms of his activities.

● Nonsupervisory duties, such as stock chasing, die checking, and material inspection, are being eliminated from the foreman's duties. Hourly employees are handling these activities.

● The foreman is being given more people to manage. By stripping away all but legitimate supervisory responsibilities, many feel that the foreman should be in charge of at least 50 workers and as many as 100.

● Systematic selection and training of qualified people is upgrading the caliber of the modern foreman.

● This upgrading of the foreman as a manager has a psychological impact: He begins to view the specialists in their proper perspective—not as crutches, but as co-operative team members to help achieve objectives.

they all share the same management interests. Two or more are always involved in decisions for major purchases; all are interested in the company's status and reputation; all are interested in the marketing and marketability of products; all are working to be promoted.

3. To the extent that products become more alike in function, quality, and price, emotional factors take over as the important influence in the selection of a brand or supplier.

Those observations underscore the need for greater emphasis on the ability of managers to get things done through people—in relations within the company and with other companies.

It's a major reason why more companies are seeking assistance from psychological testing firms in the hiring and promoting of managers. Technical ability is still the prime requisite, but the successful manager must also have drive and enthusiasm, human relations skills, a balanced temperament and personality, a high degree of intellectual ability, creativeness, good judgment, and analytical ability.

The standards are high, and they will go higher. Booz, Allen & Hamilton, management consultants, made a depth appraisal of over 1400 executives. The aim: To identify the qualifications of a promotable executive. Thirty common denominator factors were uncovered—their relative importance varies with the function and organizational level of the position. The survey also indicated that only 35 per cent of the 1400 interviewees could be classified as promotable. Of the remainder, 54 per cent were satisfactory in their present jobs; 11 per cent were inadequate.

Gaining Balance

Decentralization is helping many firms provide more managers and potential managers with a good balance of technical and managing experience, says E. D. Winters, manager of organizational planning and business research for Hotpoint. His division is decentralized along product lines—commercial equipment, home laundry, kitchen appliances, and refrigeration.

As far as possible, each product

The Six Roles of Managership

What do you do when . . .	The good manager would . . .
1. You have to fire an employee?	1. Do the job himself, not delegate it or procrastinate.
2. You seek to improve product quality?	2. Decide how to do it, then sell the idea to subordinates before initiating action.
3. You want to reorganize your department?	3. Present his ideas, then invite questions.
4. You are buying machine tools and must choose one of two makes.	4. Present the problem, ask for suggestions from subordinates, then make the decision.
5. You must decide whether to keep present office hours of 8 to 4:30 or change to 8:30 to 5?	5. Call a meeting, discuss, then follow the will of the majority.
6. You must discover why tool breakage has suddenly jumped and correct the problem?	6. Delegate the problem to subordinates.

department is operated as a separate business. For example, each has its own marketing activity which co-ordinates its operations with the general sales functions of Hotpoint. Reporting to each of the product marketing managers are a marketing administrator, product planning manager, sales planning manager, and advertising and merchandising manager. Each product group also has its own engineering and production organizations.

Job rotation also gives managers a chance for balanced experience within a company, says S. C. Amren, vice president of Charles Bruning Co. Inc. His firm has grown rapidly since 1950. A recent survey of its manager ranks spotted a definite shortage of No. 2 men in many departments. "We've started a management development program aimed at giving us 128 new managers (foremen on up) over the next five years," Mr. Amren says.

"Rotation," he adds, "provides an excellent method of watching an individual develop abilities which are required in differing degrees from job to job. Timing of the rotation is important, but each case must be treated individually. It depends first on the opportunities open to rotate individuals and then on the individual's ability to reach his peak in his current assignment."

Calumet & Hecla Inc. uses the multiple management technique to put middle managers in a position of greater management participation.

"Here's another plus factor," H. Y. Bassett, president, points out. "We feel each manager can do a more effective job if he seeks the counsel of the people under him. They do the work; they are the people to whom the manager delegates authority."

In practice, C&H's committees are composed of a manager and the submanagers reporting to him. They discuss their own problems, and no matter what they involve—quality control, financial, personnel—each member is given an opportunity to express himself. The purpose is to generate problem-solving ideas and promote understanding. No attempt is made to reach unanimous agreement. Final decisions are always the responsibility of the committee chairman.

Measuring Results

One of today's top problems is the measurement of manager performance. Decentralization has given a big assist to many firms. Hotpoint (see STEEL, Dec. 15, 1958, p. 86) has developed an approach to pinpoint accountability. Each manager and his submanager agree on the individual's goals and how his contributions and achievements will be measured.

Most companies have written job specifications or responsibilities for manager positions. Critics who advocate subjective measurement charge that job specs merely outline activities. But they admit the technique is only a step away (the first step is always the hardest) from setting specific goals which are co-ordinated with over-all company objectives.

STEEL predicts that within the next two years metalworkers will make giant strides in improving its techniques of measuring manager

THOMAS E. MILLSOP, president of National Steel Corp., was named Management Man of the Year, 1958, by the National Management Association. He was cited for "promoting the highest ideals of the free enterprise system, for contributions to management development, and for advancing the principles and ideas endorsed by NMA." Here are some excerpts from the speech he gave at the association's conference on Management in the Space Age.

Challenge of Space Age Management

A MANAGER is truly the man in the middle—in the middle of people. Consider his range of responsibilities:

- **To stockholders—for the successful operation of the business.**
- **To employees—for wages, working conditions, security, good union relations.**
- **To customers—for fair prices, quality, service.**
- **To suppliers—for fair dealings.**
- **To local, state, and federal governments—for taxes.**
- **To plant communities—for good citizenship.**
- **To the public—for continued progress (better goods and services, job opportunities, rising standard of living).**

That range points up the transition of our space age management—from concepts and methods tailored to the needs of a company in a particular line of business . . . to concepts and methods grounded on fundamentals applying to all business. The scope, speed, and diversity of business will continue to increase—and so will the demands on the manager.

What should management aim for?

Higher standards of leadership at every level. More thorough integration of management from top to bottom. Improvement of the quality of knowledge and skill in every management job.

Management can never be any better than the average of the individual managers. Improvement is a do-it-yourself job. These steps are basic:

1. More careful selection of potential managers: There must be a systematic method for locating and preparing future managers.

2. Development: Once an individual starts up the management ladder, he should not be left to his own devices. He should be given opportunity and encouraged through definite programs.

3. Integration: The first line foreman should be made to feel that he is just as much a part of management as the chief executive . . . that all managers share the same objectives and responsibilities of the company.

4. Communication: To be effective, communications must flow in both directions, accurately and quickly, for the manager to do a proper job.

performance. Two factors are at work.

First, it's a major management problem that has to be solved. Costs on the production line can often be measured to the fourth decimal of a cent, but so-called overhead costs are too often pushed around with a shovel.

Second, and probably most important, you managers in the middle ranks want recognition and the freedom to manage by target or objective. The solution will probably come from your ranks.

Democrat or Autocrat?

Finally, your key asset in keeping pace with your changing role as a professional manager is your capacity for leadership—the ability to motivate and inspire individuals to maximum performance. Every top executive interviewed placed this factor at or near the top of his list of what he most desires in a manager.

There are few places in metalworking management for the rugged individualist who calls all the shots as he sees them without benefit of outside counsel, or the indecisive person who calls a committee meeting for every detail.

The manager who is going places is a leader. (See exhibit on Page 143.) He can adjust his role to any situation.

You are looking at 14 gold-plated garbage cans

Special orders for the Texas-oilman trade? Guess again.

Fact is, each is priced *below* competition. The factory's turning out several thousand this month—for a new customer.

Unfortunately, the gold-plating doesn't show up on the product. Or anywhere else. It's concealed in a cloud of figures covering a month's operations for the whole factory. Weeks from today, somebody'll discover that the company lost money on the order . . . maybe even how *much* money. But now, the damage is done.

This story *could* have had a happy ending—with Automatic Keysort punched-card controls. A Keysort job-costing system could have computed a correct, profit-included selling price. The same system would have shown the plant manager how costs were running at each step of manufacture. He'd have spotted any impending loss *on time* . . . he'd have used his experience and know-how to eke out a profit.

Automatic Keysort is today's only data processing system that provides a family of integrated machines and methods designed for the automatic creation and processing of original records. Speeding vital day-to-day and long-range facts essential to sound management, this unique system fits easily into your present operations...is highly flexible to future growth and expansion.

With the Automatic Keysort System, manufacturing concerns of every size can now enjoy fast, accurate data processing on either a centralized or decentralized basis. Without restrictive, complex procedures. Without specialized personnel. And at remarkably low cost.

Call your nearby Royal McBee Data Processing Representative, or write Royal McBee Corporation, Data Processing Division, Port Chester, N. Y. for illustrated brochure F-2.

ROYAL McBEE · *data processing division*

NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION

on the world's most powerful known turbojet—

FAFNIR breaks the "bearing barrier!"

Breaking the sound barrier is duck soup for planes equipped with the mighty Pratt and Whitney Aircraft J75, our most powerful production turbojet.

A far tougher "barrier" was the problem of meeting main rotor bearing specifications. Conventional bearing construction couldn't take the loadings and temperatures encountered in such an application. Pratt and Whitney Aircraft looked to Fafnir for help.

Result: custom-designed and custom-built bearings tailor-made for the J75 main rotor mounting. Fabricated of vacuum-melted steel, these bearings feature intricate, split inner ring construction. Tolerances are held to millionths-of-an-inch.

This masterpiece of bearing engineering is another example of how Fafnir research and production facilities are geared to the increasingly complex needs of the aircraft engine and airframe industries. Worth bearing in mind when *you* hit a "bearing barrier!" The Fafnir Bearing Company, New Britain, Conn.

FAFNIR
AIRCRAFT BEARINGS
FIRST at the turning points in aircraft design

Fafnir J75 Main Rotor Bearing, one of 23 Fafnir bearings used in P&WA jets and accessories. Each of these super-precision bearings is exhaustively factory-inspected on special equipment —including many highly refined devices developed by Fafnir for this purpose.

The Pratt and Whitney Aircraft J75 turbojet, Fafnir-equipped, packs 20,000 pounds of thrust.

OLP STEELMAKING PROCESS— The French say their OLP method of refining pig iron with pure oxygen and lime powder produces steel which is the equivalent of high quality open hearth types. A controlled amount of pure oxygen and lime is fed into a molten bath held in a conventional solid bottom, converter vessel. IRSID, the French iron and steel research institute, says the Denain works of USINOR Steel Co. has produced and sold 10,000 tons on the basis that the material is the equivalent of open hearth steel. USINOR is expanding, so it can produce OLP steel in greater quantities.

HIGH TEMPERATURE MATERIAL— Graphite particles bonded with silicon carbide combine the better high temperature properties of the two materials to improve missile designs, says Carborundum Co., Niagara Falls, N. Y. The composition doesn't oxidize as readily as pure graphite and is stronger, resisting thermal shocks and erosion at 4500° F.

THIN SPIN— Problem: How to spin 0.003 in. stainless into a cone. Being Airplane Co., Seattle, solved it by gluing the blank to 0.040 in. thick aluminum. After forming, the glue is dissolved to separate the finished piece.

NEW FINISHING PROCESS— Stainless steel can be given a frosty look with a new process called "semiblasting," says Stamping Service Inc., Detroit. It produces a variety of patterns without penetrating the metal surface. So corrosion resistance isn't changed. Although the process is used primarily for auto parts, it can be applied to any stainless decorative piece, says the firm. It is also working on colored variations.

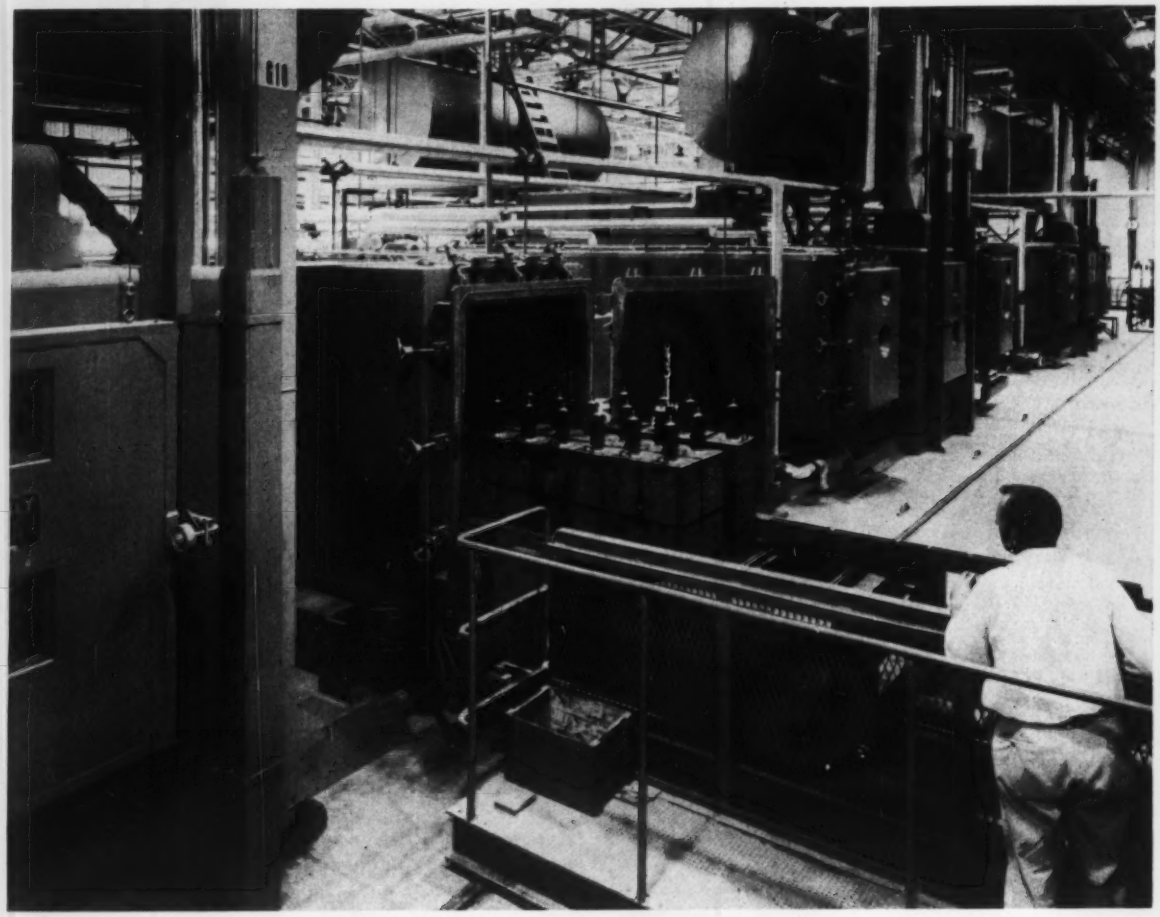
MORE ATOM METALS— Ductile yttrium and a Type 304L stainless containing 2 per cent boron are important steps in helping scientists and metallurgists make better atomic reactors less expensively. The Bureau of Mines found that yttrium becomes workable (95 per cent reduction) when you eliminate the oxygen. Its low neutron cross section and fairly high melting point (2825° F) make it attractive for special jobs. Carpenter Steel Co., Reading, Pa., air melts the stainless in an electric arc furnace. Previous techniques required vacuum furnaces with melts of less than 4000 lb. The stainless is for reactor control rods and shields.

REDUCES PAPERWORK— A technique called mechanized manufacturing information reduced preproduction paperwork costs more than 18 per cent for Westinghouse Electric Corp.'s Baltimore plant. (It makes electronic equipment for Bomarc missiles.) By putting all routine information needed by planners on tape or punched cards (purchasing sources, costs, equipment availability, and similar material), clerical help and research are significantly reduced. Present costs for such planning run about 18 cents per productive manhour.

TAPE CONTROLLED WELDING— One of the first automatically programmed resistance welders in Britain saved its owner 85 per cent in assembly and welding time. The device positions the parts, selects electrical values, makes sample welds, inspects them, and tells an operator when it's time to clean or change electrodes, says *Welding & Metal Fabrication*, London.

CHEAPER BRAZED HONEYCOMB— A new process brazes honeycomb panels in a comparatively simple, gas fired, infrared furnace without the need for carbon blocks or long layup times, says Temco Aircraft Corp., Dallas. A continuous method, it is simpler than batch techniques. Temco says its process handles panels of any size without significant warping.

HIGH TEMPERATURE SANDWICH— A new way to bond tantalum and copper combines the strength and corrosion resistance of tantalum and the heat conductivity of copper, says Stanford Research Institute, Menlo Park, Calif. The sandwich is said to be effective at 3600° F in missiles and nuclear reactors.



Operator is loading a Stokes vacuum furnace. Overhead storage tanks contain dielectric fluid which fills entire furnace chamber after evacuation. The system eliminates air bubbles or voids

Electrical Industry Offers Growing Market for Parts

LOOKING for new markets that will take some of the valleys out of your production curve?

You might consider making metal parts for electrical equipment. The industry hardly felt the recession.

1. Utilities spent a record $5.6 billion for new plant and equipment in 1958.

2. The industry more than doubled its output during the last ten years.

3. Electrical output will double itself every nine years, says Charles E. Eble, president, Consolidated Edison Co. of New York Inc.

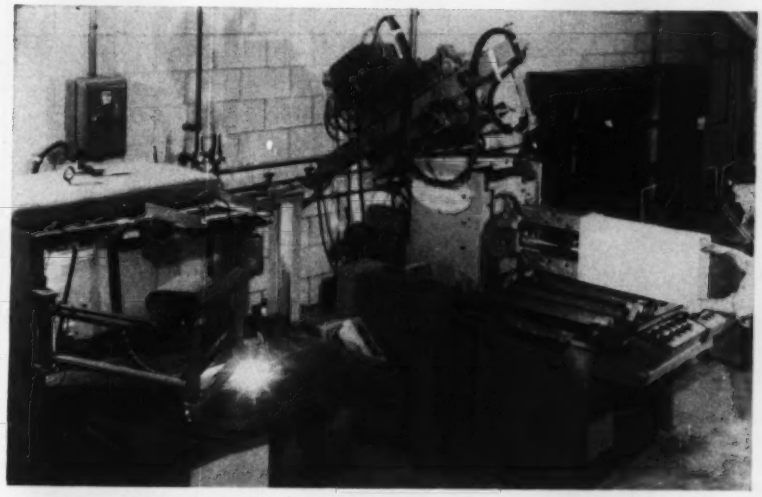
• **Case History** — Westinghouse Electric Corp., Pittsburgh, is decentralizing; its new plant at Bloomington, Ind., makes a variety of metal equipment for the distribution of electricity. It uses many garden variety metalworking processes. Those used for condensers are an example.

Depending on size, condensers contain thousands of feet of paper-insulated aluminum foil (0.00025 in.). The casing is made of an aluminum-killed fender steel, 0.050 in. to 0.062 in. thick.

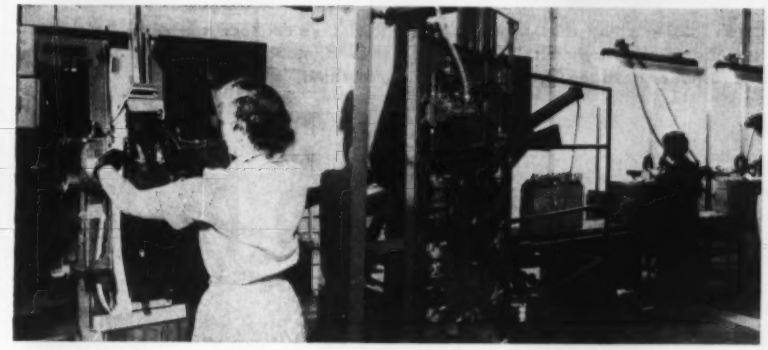
Manufacturing and testing are highly automated. The line has four parts: Section winding, assembly, impregnating, and testing.

Insulating paper and aluminum foil are first wound into sections which weigh about 2 lb. One of the standard types of condensers has 20 such sections in one container.

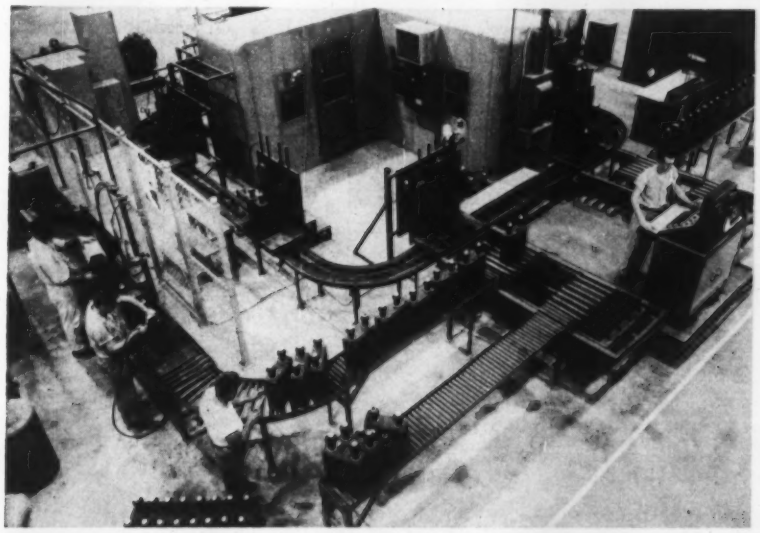
In case fabrication, flat sheets are sheared, formed, and seam welded automatically into a rectangular



Condenser can get its start here. Bender-welder folds and joins can walls. Welder (left) joins bottom to sides. Pantograph arm rides template at top of frame



Neat, packaged sections of aluminum foil are vital elements. Air piston compresses them to can size; girl binds them with wire. Leads are later soldered to terminals (right)



Automatic testing machine has eight stations. Console (right) passes punched card instructions to Cypac control housed in center structure. Condensers are loaded on the far side and pass counterclockwise to discharge side (left). Hydraulic transfers ease distribution to O.K. and reject conveyors.

case. Another machine, designed and built by Westinghouse, welds the base to the case. (Getting the torch to track sharp corners perfectly was solved by a pantograph arrangement and a template.) A spotwelder installs two brackets.

• **Improved Handling** — Westinghouse uses large vacuum ovens to insure complete penetration of the impregnating compound. A mechanical arrangement automates the handling.

Condensers arriving at the oven area from the testing operation are strapped into groups and pushed onto steel trays from a roller conveyor. A loader operating on tracks picks up the trays and moves them to the ovens or preheaters. It permits one operator to load and unload an oven or to move a hot load from a preheater to an oven in 20 minutes.

Preheating the condensers to 275° F eliminates moisture and speeds the filling operation. When the cans are completely filled they are cooled and a small amount of dielectric fluid is added to make up for shrinkage. The cans are then soldered shut and tested for leaks.

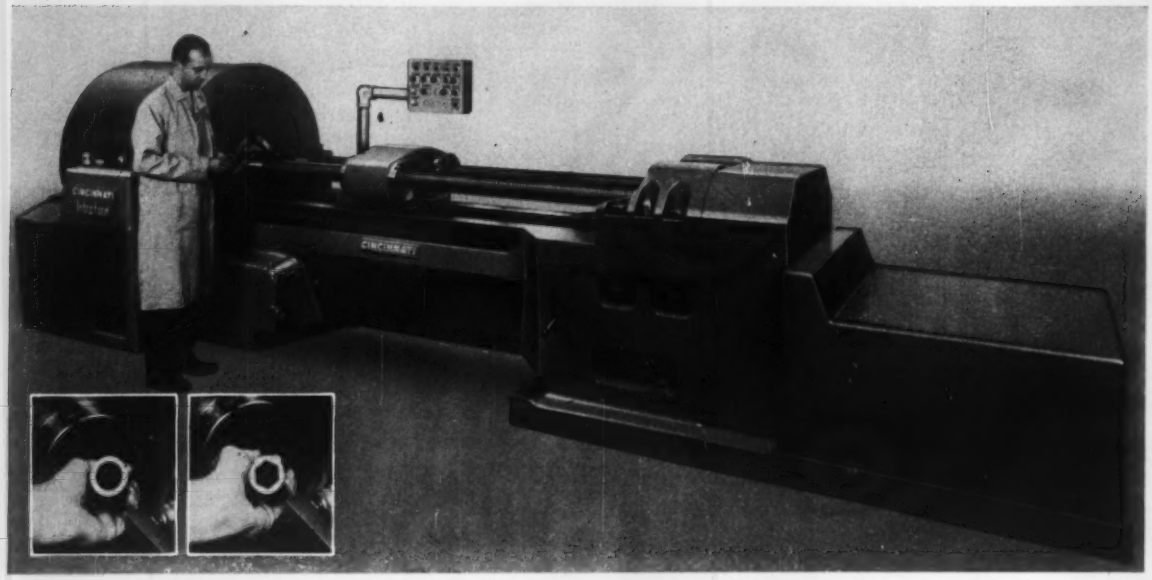
• **Surface Treatment, Testing**—Each can passes through a shotblaster to prepare the surface for zinc metallizing. After the zinc is applied, a final coat of lacquer—put on electrostatically—seals the zinc and provides additional weather resistance.

Westinghouse chose to automate its testing to eliminate human error and judgment. One man operates a carousel testing machine which has eight stations.

Capacitors are delivered from an overhead conveyor and gravity fed to a transfer carriage. Once on the test conveyor, each unit moves automatically. Test leads are attached manually at the first station. A punched card fed into a master reader sets up the Cypac control unit which conducts the tests at the other stations. Units are automatically unloaded and conveyed to a shipping or rejection area following the testing.

Test results are transferred to a tape and permanently stored.

Westinghouse finds such care is necessary to keep field failures to something under one half of 1 per cent.



Here's the machine that applies the principles of chipless machining to the inside diameter of cylinders. The inset shows a mandrel and workpiece, before and after a hexagon profile has been generated

Now You Can Form ID Profiles

Low cost tooling is used to generate complex contours in long cylindrical parts. Machine can also form laminated tubes, reduce IDs

IF YOU make parts that are cylinders with shaped inside diameters, a new machine may help you do the job faster and cheaper.

Called Intraform, it's built by the Meta-Dynamics Div., Cincinnati Milling Machine Co., Cincinnati.

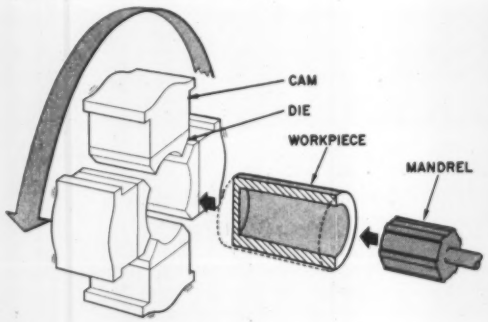
The chipless process is designed for relatively inexpensive tooling. Parts can be $\frac{1}{8}$ to 5 in. in diameter and up to 75 ft long.

• **Jobs** — The process will handle nonferrous and ferrous parts. You can start with premachined blanks, tubing, castings, forgings, or powder metal parts.

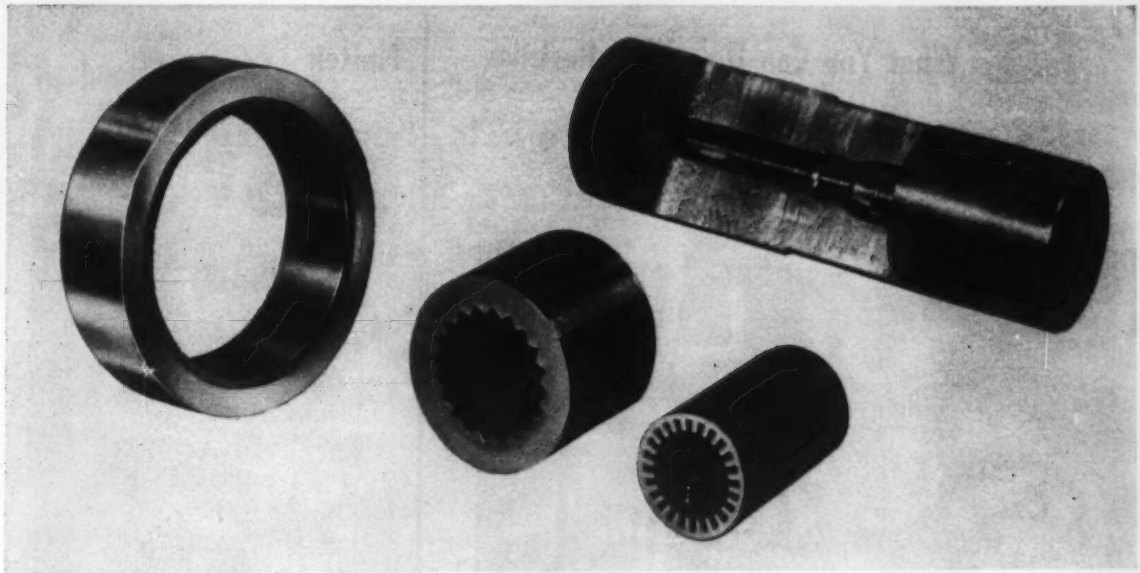
Besides forming profiles in open or blind holes, the machine has other practical applications. One is to bond two or more metals to form laminated tubing. Another is to point, reduce, or taper tubular or solid parts. Example: High speed steel punching pins have been turned out at the rate of 60 an hour. The pins ($8\frac{1}{2}$ in. long) were formed from $4\frac{7}{8}$ in. long blanks. The machine reduced a section of the part from $\frac{1}{2}$ to 5/16 in. in diameter and formed a smooth radius near the end.

The HSS pin used to be turned from stock that had to be $8\frac{1}{2}$

How Profiles Are Formed



Here are the three forming elements: The die, workpiece, and mandrel. The cam moves to contact rollers in the machine headstock



These parts were turned out on the machine. At left is a seamless steel tube bonded to a brass lining. At upper right, a chambered and rifled gun barrel. At center, a C 1020 ratchet formed at 300 an hour. At lower right, formed fins in copper tubing. Rate: 16 in. of tubing a minute

in. long. With the reduction in blank size, material savings ran to $202.65 on a 700 part run; production time was cut to less than half what it used to be.

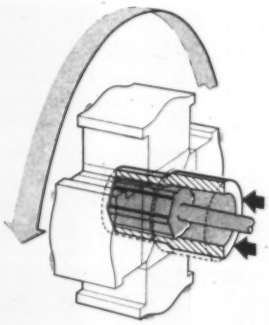
Damascus Tube Co., Greenville, Pa., will use one of the machines on a wide variety of materials, from brass to the stainless alloys and zirconium.

On one job being studied, Damascus engineers feel they can reduce 52100 tubing, getting close tolerances and eliminating the first machining operations in making bearings.

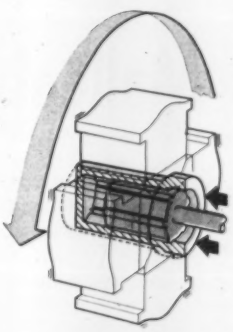
• **Plusses** — Test and production runs have proved that the process can hold close tolerances and produce good surface finishes. On many jobs, over-all size limits of 0.0002 in. can be held on the inside diameter profile. The finish depends largely on the nature of the surface before forming and the physical properties of the metal.

AISI 4140 rifle barrels had a 32 microinch finish after drilling and reaming. After the Intraform operation, which forms the rifling, the finish averaged 7 to 8 microinches. On a sleeve of AISI 8640 having a bored hole, the finish was 125 microinches. The Intraform improved the finish to 8 microinches while forming the tapered inside diameter.

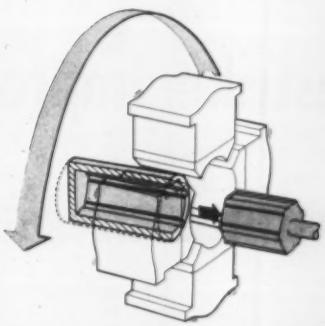
In addition to bettering the finish and holding close tolerances, the cold working operation improves properties.



Workpiece and mandrel are in position in the rotating dies. Contact with the dies causes the part and mandrel to revolve



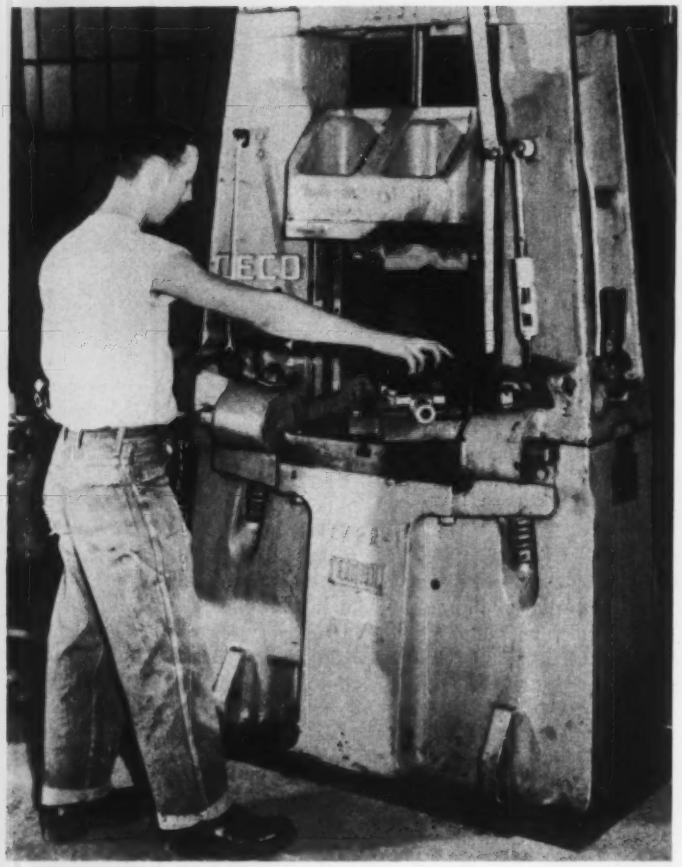
Workpiece feeds over the mandrel, reducing the part diameter and reproducing the mandrel form on the inside of the cylinder



The operation is completed. The mandrel has been retracted. The next piece would eject the finished part from the die

What You Can Do with a Restrike

By ROBERT B. STUBBS
Consultant
Chambersburg Engineering Co.
Chambersburg, Pa.



An operator gets set to restrike a malleable iron casting, using malleable iron dies. He is flattening a yoke for an automatic pin spotter

Flatten

Flattening is probably the simplest restrike operation. These parts are typical. No machining was necessary on the two hinge castings after they were flattened

Restrike Improves Malleable Castings in Many Ways

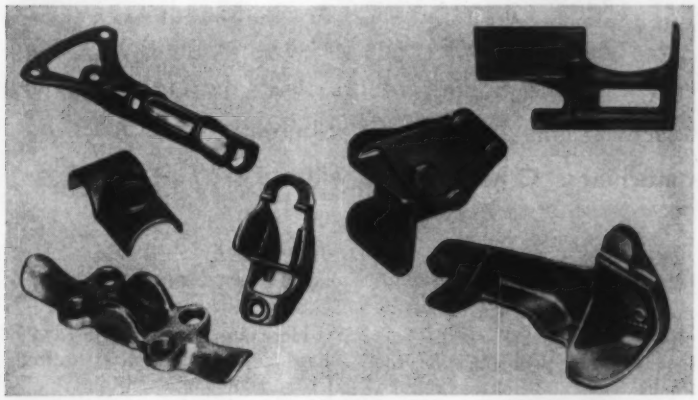
Warpage from annealing can be corrected by impact blow. Parts can be coined to close tolerances. You may be able to eliminate some machining operations

RESTRIKING malleable iron castings results in lower manufacturing costs, closer tolerance parts, and fewer rejects.

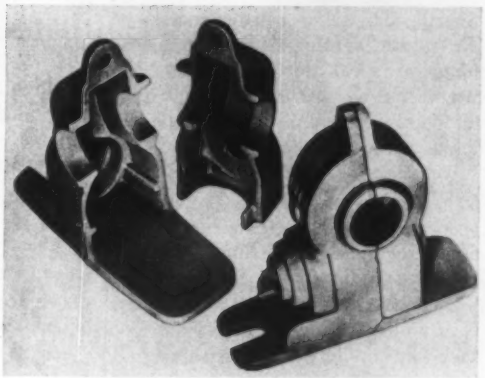
Those conclusions are based on explorations made in four foundries: American Malleable Casting Co., Marion, Ohio; Galt Malleable Iron Co., Galt, Ont.; I. F. Mfg. Co., New Philadelphia, Ohio; and International Harvester Co. of Canada Ltd., Hamilton, Ont.

They found that the restrike not only corrects warp, but also coins cast parts to close tolerances. Frequently, subsequent machining operations can be eliminated.

Reshape



Castings like these are likely to warp severely during annealing. They were restruck to correct warp. The three parts on the right required straightening both for flatness and to correct angles and bearing surfaces. Restruck angle castings are easier to machine. The bracket (bottom right) was struck to correct for twist, align bosses and connecting angles. Cast iron dies were in good condition after a run of 100,000 right and left-hand parts

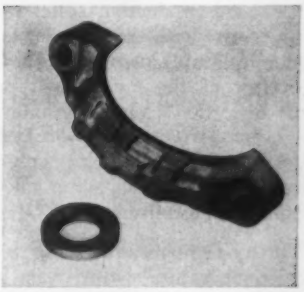


Both sections of this gearbox cover used to be hand straightened and the mating surfaces were ground extensively. Now the parts are coined in a 21 x 18 in. Cecostamp. The fit is good (see assembly at right) and rejects are held to a minimum

Straighten-Machine

Striking this cast wrench straightens the handle. In the same operation, a shaped steel plug broaches the wrench opening

Size



The small washer is cast, then coined to thickness within 0.004 in. The pipe collar is straightened and coined. The inside radius is held to less than 0.010 in. tolerance. To get accuracy and good die life, steel dies were used

• **Savings**—Distortion or warpage most often occurs during annealing. With a 100 per cent restrike practice, each casting can be inspected and sized in one operation. This may let you eliminate the job of packing parts in baskets to minimize warping. The time required to set up and strike in the Cecostamp is often less than that required for manual inspection and straightening.

Production rate is determined by the time required to place the casting on the bottom die and strike one blow. One company cited an average rate of 1000 parts an hour on jobs being sized, coined, and straightened. Highest production rate reported was 2000 parts an hour.

• **Tooling**—Because of tooling simplicity, short run quantities can be restruck economically. One manufacturer has 200 active die sets for his Cecostamp, and he plans to have dies for 80 per cent of the items he casts. Average die cost in this case is only $80 to $90 a set.

Dies are cast from a match plate or an actual pattern of the part. Plaster casts may be taken from a sample part. For high die strength and long die life, a malleable iron of 2.50 silicon and 3.50 carbon, or a gray iron of 1.10 silicon and 2.20 carbon, with at least 0.70 manganese, are commonly preferred. Steel inserts can be used where abnormal wear is expected. Occasionally, simple dies may be fabricated from steel; they usually are less expensive than a cast die.

• **Bonus**—The abrupt application of pressure that goes with an impact blow permits the Cecostamp to set the metal without springback. This, with the accurate sizing, often allows reduction in casting weight,

since finished surfaces can be cast to closer tolerances.

Automatic restrike operations, utilizing mechanical part handling systems with other varieties of impact equipment, are being developed by Chambersburg.

Salt Bath Furnaces Offer Flexibility

LOOKING for flexibility in heat treating? Salt bath furnaces may be the answer.

Three at the Columbus, Ohio, plant of North American Aviation Inc. assure better heat treating for a wide range of dies and aircraft parts. The system was designed and built by A. F. Holden Co., Detroit. It's being use to heat treat a variety of parts in experimental quantities and processing others on a production scale.

The salt bath process is fast, economical, and doesn't leave scale. Buoyancy of the molten salt prevents distortion caused by uneven weight of parts. Also, heat penetrates evenly; that helps prevent warping and provides better microstructure uniformity.

• **Three Temperature Ranges**—A high temperature bath treats air hardening and high density alloys at 1800 to 1875° F. Temperatures can be boosted as high as 2400° F for high speed steels.

A second bath processes SAE aircraft steels at 1500 to 1650° F, or preheats work that's later treated in the high temperature bath.

Another bath tempers high speed and air hardening steels at 1000 to 1200° F, or preheats regular commercial steels.

• **Construction**—Each furnace tank is double-walled. The inner wall is made of high temperature ceramic material. Insulation separates it from the steel outer wall.

Electrodes pass through baffles near the back wall of the furnace. Entrance holes fill with molten salt, which solidifies and prevents air from reaching parts of electrodes at radiant heat.

The right amount of agitation is provided by proper placement of electrodes in the baths. That prevents variations of more than 2.5° F from the desired temperature.

Builder Answers Challenge

Here's how one builder rebuts claim that recent gains in productivity can be attributed to materials and tools, not to the machines. Other builders will agree

MODERN machine tools are as important to achieving success with new materials and new tools as the King is to a royal flush.

But at a recent meeting of the National Screw Machine Products Association, some users cited recent improvements in productivity and said they came from improved materials and tooling, not from machine improvements.

• **Not Guilty**—In rebuttal, George A. Hawkins, director of market research and sales promotion, Brown & Sharpe Mfg. Co., Providence, R. I., says: "While we will not presume to speak for all manufacturers, we do know our single spindle screw machines have been completely redesigned within the last five years."

Here are five features Mr. Hawkins says have led to greater gross production of B&S machines:

1. Higher spindle speeds that can turn out up to 15 per cent more brass, aluminum, and plastic parts, as well as smaller diameter steel parts with high speed steel tools. The same increases apply to steels, coppers, and bronzes with carbide tools.
2. Rapid pull-out arrangements (standard equipment on some models) result in further production savings on deep holes.
3. Greater turning capacity allows longer parts to be made on smaller, faster machines.
4. Greater bar capacity means larger work may be done on the smaller, faster machines.
5. A standard brake-in-neutral attachment allows more operations to be done in primary handling.

• **Net Gains**—Mr. Hawkins figures net production is even more important than gross production. He defines net production as the product of gross production and operating efficiency.

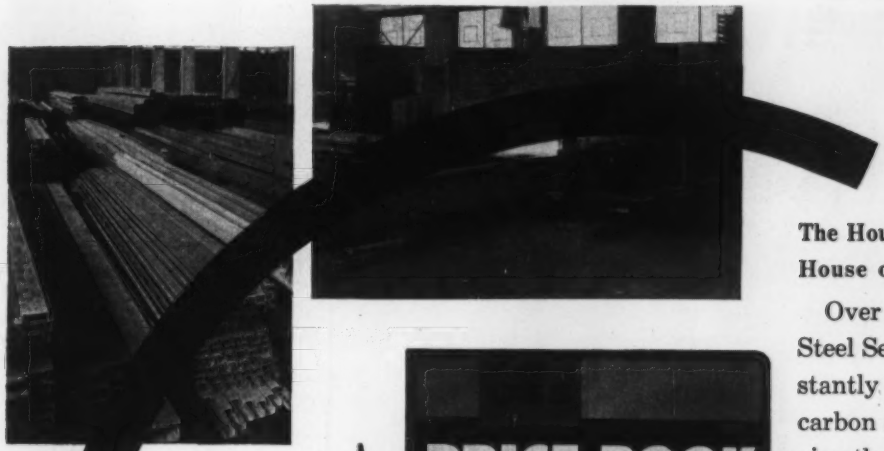
Here are the steps he says B&S has taken to boost operating efficiency of the machines:

1. Greater accuracy, which reduces setup time and gives greater tool life between adjustments and sharpenings.
2. Improvement in accuracy also eliminates finishing operations in many cases.
3. Positive stopping with an indicator to show when the machine is out of stock—reducing nonproducing time.
4. On high speed machines, spindle bearing adjustments have been eliminated, and clutch adjustments are easier to make on all machines. This helps cut downtime.
5. Feed change gears can be applied more quickly.
6. Removable chip trays reduce the time needed to clean the machine when changing materials.

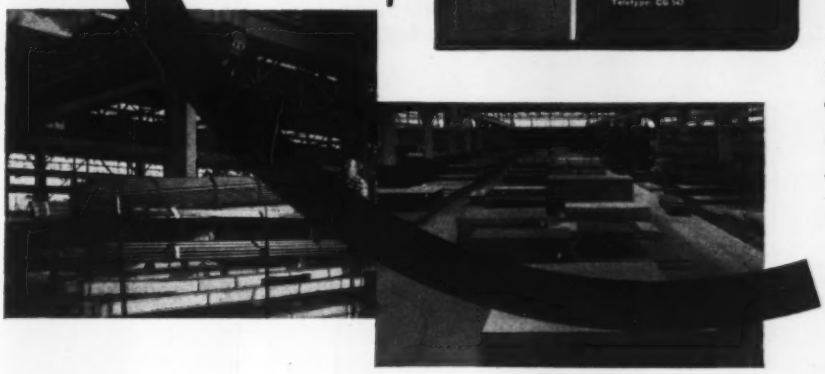
That's the way Mr. Hawkins states his case. Builders admit they'll have to make major machine improvements to help their customers compete in the Space Age, but they are quick to rise in righteous indignation at any implication that they've been asleep.

Numerical Controls Goal

Next step in numerical control's growth will be to make it applicable to industry's host of short-run producers. Two machines built by Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., are designed to meet such needs. One is a vertical turning and boring machine. The other is a vertical turret lathe, said to be quite flexible.



YOUR DOORWAY TO CARBON STEEL ITEMS, TOO!



The House of Stainless is the House of Carbon Steel, too!

Over the years, Chicago Steel Service has been constantly expanding stocks of carbon steel—to be able to give the same prompt, personal service on these items as well as stainless.

In this day and age, it makes sense to do business with a House that specializes in these two important production materials.

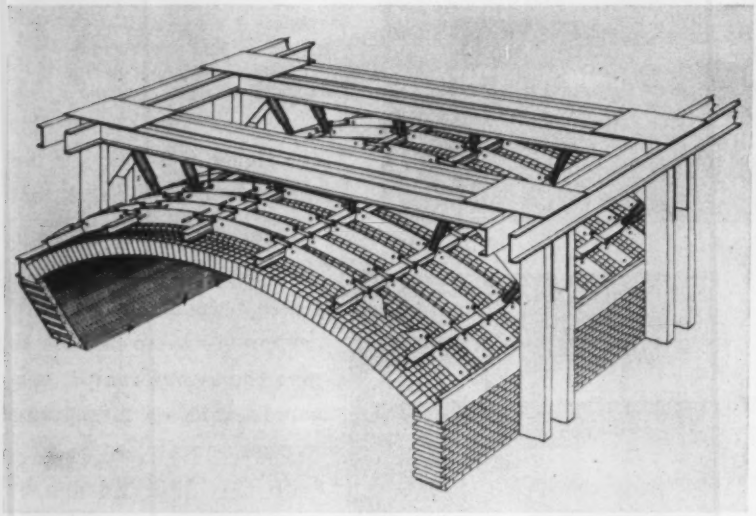
Typical of the advantages of doing business here is the new CSS Price Book which gives you any carbon steel price at a glance . . . without having to turn a page. As one of our customers put it, "This book makes it easier than ever to order carbon steel from the House of Stainless."

Please phone
LAfayette 3-7210

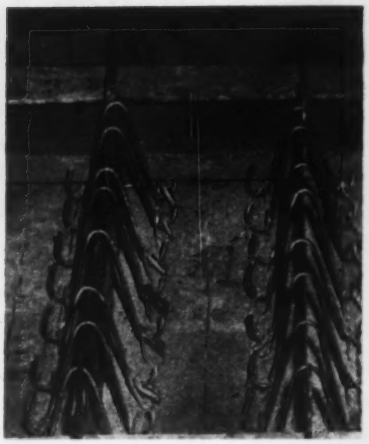
CHICAGO STEEL SERVICE COMPANY

Kildare Avenue at 45th Street, Chicago 32, Illinois • Mailing Address: P.O. Box 6308, Chicago 80, Illinois

Milwaukee District Office: 757 N. Broadway, Milwaukee 2, Wisc. Telephone: BRoadway 3-7874
Sales Representatives at Bloomington and Rockford, Illinois • Indianapolis and South Bend, Indiana
Davenport, Iowa • Grand Rapids, Michigan • Minneapolis, Minnesota • Appleton, Wisconsin
YOUR DEPENDABLE SOURCE FOR BOTH CARBON AND STAINLESS STEEL



In one furnace design, roof contour is controlled by I-beams; rigidity is maintained by tie plates running from the front to the back of the roof. Stiff connections from the I-beams to the binding structure limit roof expansion



I-beams and tie plates, held in position by a rigid binding structure, establish arch in one type sprung-suspended roof. Bricks, reinforced with metal inside and out, are hung individually from the tie plates

Basic Open Hearth Roofs Cut Cost, Boost Output

Use of oxygen increases temperatures, cuts heat time; better bricks and improved construction offer longer campaigns and more tons of steel per hour

IF YOUR company makes or uses steel, you'll be interested in basic open hearth roofs because they offer greater production and lower overall costs. You'll also want to keep up with the latest in construction methods.

Use of basic, rather than acid (silica) bricks in open hearth roofs has increased sharply in the last two years. About 10 per cent of the open hearths in this country have basic roofs; United States Steel Corp. expects to have basic roofs on 20 per cent of its open hearths by mid-year.

Most of the new roofs are of sprung arch construction, with varying amounts of suspension, from almost none to full suspension. A rigid steel structure holds the roof up, but also holds it down, limiting expansion. That removes stress from the hot face of the bricks and prevents spalling.

• **Uniform Wear Wanted** — The goals of all steelmen—higher production, lower cost—can be reached through greater furnace availability. If there's less downtime, more steel can be made.

Wear in the open hearth isn't uniform. Silica roofs wear faster than the sides or ends and usually determine the length of the campaign. Often, when the furnace is down for roof replacement, usable parts are discarded because they wouldn't outlast a new roof.

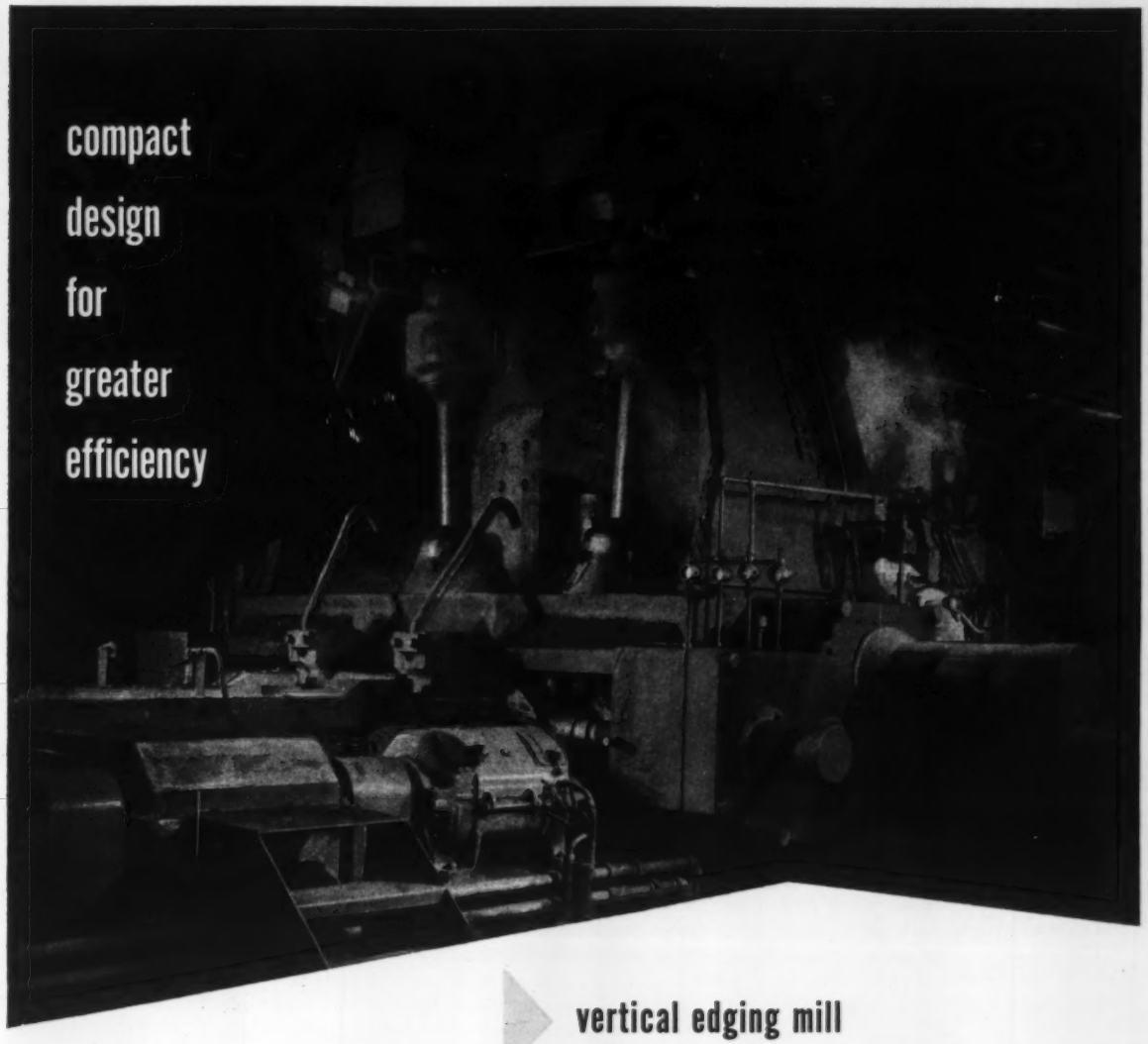
In the ideal open hearth, all parts would wear out at the same time; one shutdown would allow complete rebuilding. Results: Fewer shutdowns, fewer usable parts wasted.

Many steelmen doubt that a balanced furnace can be designed, but they're working toward it with the modern basic roof. It wears about twice as long as front walls, about half as long as furnace ends; back wall repairs are usually necessary before the roof wears out. Campaigns are limited more by full slag pockets or other difficulties than by roof life.

• **Basic: Why It's Better**—Basic refractories used here and abroad are made of magnesite and chrome, in varying proportions. They're chemically bonded or fired, and often metal plated and reinforced with internal plates to reduce spalling.

Bricks containing more magnesite than chrome are called magnesite-chrome; those with more chrome are called chrome-magnesite.

With the basic roof, oxygen can



vertical edging mill

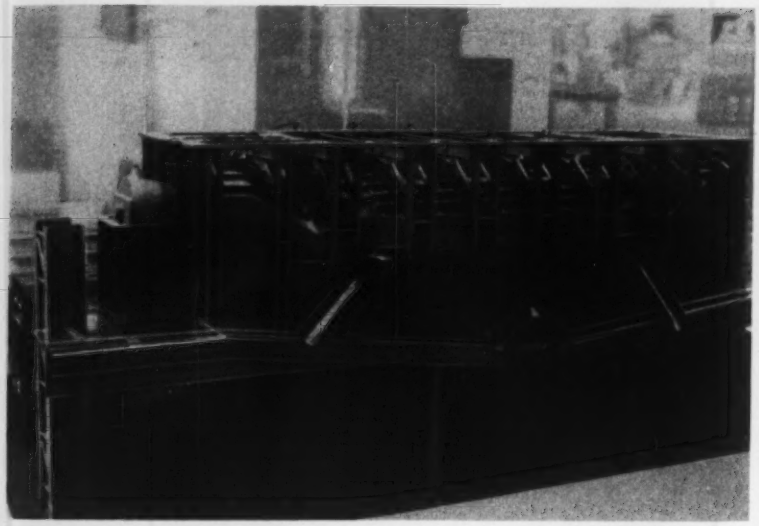
The overhead design of this edging mill is the key feature of this typical PITTSBURGH installation. Increased operational efficiency is a natural result of special design.

One giant casting *outlined in yellow in the photograph* was produced by Pittsburgh Steel Foundry Division. Extensive machining facilities are combined with one of the largest steel foundries in the world to produce the finest possible equipment for our customers in the shortest possible time.

We invite your inquiries for primary and auxiliary rolling mill equipment.

"Electric and open hearth steel castings from 1 lb. to 100 tons"

PITTSBURGH
ENGINEERING & MACHINE
Division of Pittsburgh Steel Foundry Corporation
P.O. BOX 986, PITTSBURGH 30, PENNSYLVANIA
PLANT AT GLASSPORT, PENNSYLVANIA



Basic, suspended arch roof, popular in Russia, is similar to those used in this country, but has more connections from roof supports to the binding structure

be used to increase furnace temperatures. It can stand temperatures above 3250° F (vs. about 3000 for silica) without apparent damage. Faster heating and greater steel output (some say as much as 30 per cent more) make up for the higher cost of bricks.

The basic roof lasts about twice as long as a comparable silica roof and can take more abuse in the form of human error or chemical corrosion. It can be shut down, then reheated more successfully than silica up to about 1200° F.

Spalling, formerly a weakness in basic roof materials, has been reduced by improved bricks and better furnace construction.

• **Popular Designs** — Most basic roofs are built on arched forms, as are silica roofs. I-beams, running from one end of the furnace to the other, hold the roof contour. Beams are fastened to the rigid furnace binding structure. Tie plates, between courses of bricks and perpendicular to the I-beams, are spaced 3 to 6 bricks apart. In some roofs, the metal plated bricks are suspended from the tie plates on wire hangers.

Most of the basic roofs in this country are of the sprung arch, or sprung-suspended type; others are of flat, suspended construction.

• **Other Types Tried**—Sprung basic roofs were used successfully in American copper melting furnaces as early as 1928. Bricks were chemically bonded magnesite-chrome, metal encased.

Sprung roofs without hold-downs were tried on some open hearths in the U. S.

The roofs deformed noticeably and finally collapsed.

Some checkerboard, or zebra sprung roofs, combining basic and silica bricks, were tried with varying success. One such roof, built in 1955 by Republic Steel Corp. in Cleveland, combined silica and fired magnesite-chrome bricks. Silica sections wore faster than basic, and eventually caused roof failure. Later, Republic used all-basic roofs successfully.

The first suspended, all basic roofs in the U. S. (about 1940) featured vertically hung bricks. Center of the roof was flat; corbeled sections near the front and back walls (bricks suspended at different levels) gave the roof a rough arched appearance. That permitted lower front and back walls to be used. It was found that corbeling caused shearing stresses on the hot end of the bricks and eventual roof failure.

The flat, suspended roof was designed without corbels; it was expected to eliminate buckling but didn't. Some flat suspended roofs are in use, but they aren't gaining popularity.

• **Progress in Europe**—In Germany and Austria, basic shoulders and combination basic-silica roofs, similar to the zebra construction tried for a time in the U. S., started the trend toward basic roofs.

All-basic roofs were used in Germany as early as 1932, and adopted later in France and Italy. Silica bricks in Europe are of lower quality than in this country. That may have helped swing Europeans to the basic roof.

Popularity of basic has come slower in Britain; most roofs there are silica, even though most furnaces on the European continent have basic roofs.

The first basic roofs in Europe were of sprung arch construction, with fired chrome-magnesite bricks. That construction was satisfactory for smaller furnaces (some had a 66-ton capacity).

Later, rib and valley construction became popular. Rib courses of bricks, running from the front to the back of the furnace, were wired to inverted T-irons that followed the desired roof curvature. Valley courses were sprung. Hold-down devices and a spring-loaded skewback limited roof expansion.

As early as 1956, basic roofs were used on 40 per cent of the open hearths in Western Europe. They're popular behind the Iron Curtain, too; Russians boast that roof life has been increased 100 to 150 per cent through the use of suspended radial roofs and basic bricks. They report that melting chamber temperatures have been increased as much as 270° F.

• **Brickmakers Help**—Suppliers of refractories are pulling all stops to meet demands for more and better basic bricks.

They say they'll make all the steel industry calls for.

Harbison-Walker Refractories Co., Pittsburgh, has an unlimited source of high purity magnesite, extracted from brine at its plant in Ludington, Mich.

General Refractories Co., Philadelphia, introduced bricks with internal plates for improved spall resistance. General's supply of basic raw materials, here and abroad, assures adequate bricks to meet increased demand.

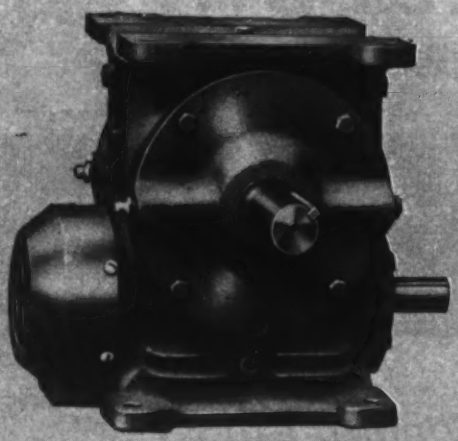
A new plant for extracting magnesia from sea water, the first of its

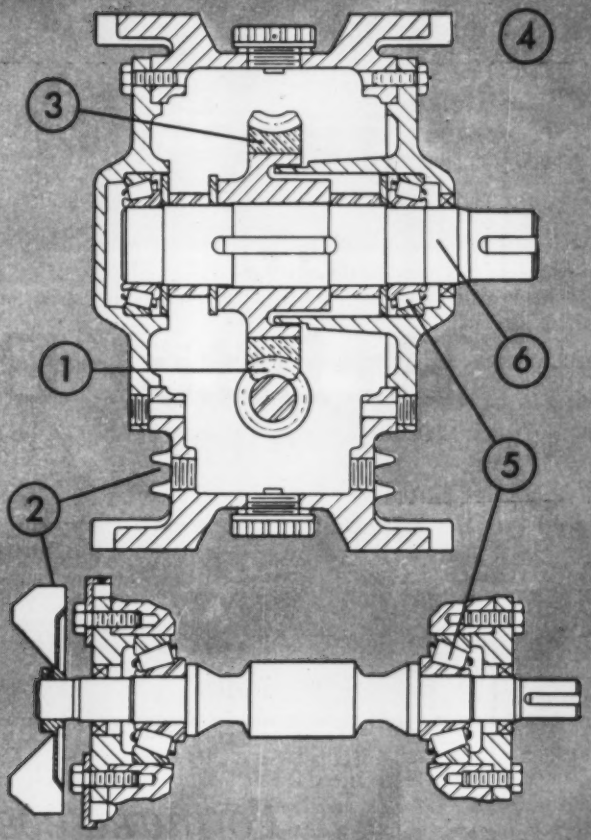
DELROYD

VERSO WORM GEAR
SPEED REDUCERS

a new standard in worm gear design

smaller space and more horsepower per dollar





Make this value analysis NOW!

1. Involute helicoid thread form has highest load capacity of any type of worm gear.

2. Fan cooling and ribbed construction give maximum effect of heat dissipation.

3. Centrifugally cast bronze dished gear—dry well construction.

4. Unit may be mounted in any position. Alternate mounting surfaces.

5. Tapered roller bearings used throughout—provide maximum load capacity.

6. Heat treated alloy steel gear shaft with bearing and sealing diameters provide a strength of 185% of an untreated shaft of the same diameter.

Send for Catalog No. 5018

DE LAVAL *Steam Turbine Company*

860 Nottingham Way, Trenton 2, New Jersey

DL444

There's just One Rule at Bristol Brass...

To make every pound of strip, rod and wire the way we would want it, if we were buying it

Bristol-Fashion
means Brass at its best

THE BRISTOL BRASS CORPORATION • SINCE 1850, MAKERS OF BRASS STRIP, ROD AND WIRE IN BRISTOL, CONNECTICUT

Bristol Brass has offices and warehouses in Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Rochester, Syracuse.

kind in the South, was recently put in operation at Pascagoula, Miss., by H. K. Porter Company Inc., Pittsburgh. The company will produce a variety of basic refractories there.

Another supplier, Northwest Magnesite Co., operates a large sea water grain magnesite plant at Cape May, N. J. Northwest also produces dead burned magnesite from a large deposit of the natural mineral at Chewelah, Wash.

Lubricant Used Two Ways In Sendzimir Sheet Mill

A COMBINATION bearing lubricant and rolling oil, with an extreme pressure additive, helps Atlas Steels Ltd., Welland, Ont., reduce bearing wear and eliminate staining on cold-rolled sheets. It increased bearing life on a Sendzimir mill by more than 50 per cent.

The oil, Rol-Kleen #6, is supplied by D. A. Stuart Oil Co. Ltd., Toronto, Ont. Combining high strength for bearing lubrication and high lubricity for rolling, it's pumped from a 1700 gallon storage tank to the roll bearings and the flood type roll feed system.

A Monel screen and bag type filter reclaim used oil; carry-off is replaced continuously.

Lubricants used previously for bearing lubrication and rolling lost their lubricity; sulfur pickup caused staining on aircraft alloy and stainless steel sheets.

The Sendzimir mill at Atlas makes as much as 8 per cent reduction per pass, and averages five to six passes on each sheet. Every 7¾ hour shift, about 1000 passes are made. Finishes produced: 2B, 2D, and light gage No. 4.

Electron Furnace Going In

An electron beam furnace for melting and casting refractory metals (see STEEL, Mar. 24, 1958, p. 108) will be installed at the Albany, Oreg., plant of Wah Chang Corp., by Stauffer-Temescal Co., Richmond, Calif.

Electron bombardment in a high vacuum melts reactive materials with high melting points, producing high purity ingots.

Operator removes silver brazed assemblies from woven wire belt emerging from the cooling end of the electric brazing furnace. Automatic brazing has practically eliminated rejects

Brazing Furnace Pays Off

AUTOMATIC brazing has increased production 200 to 1500 per cent at Edwards Co., Norwalk, Conn.

In addition, it has practically eliminated defective assemblies. Closer control over heating and cooling rates has improved quality.

• **Production** — Edwards makes some 25,000 components for signal, communication, and protection devices. Many assemblies require brazing.

Parts for the systems are brazed in batches—about 11,000 in an average week.

Conventional hand torches were formerly used, but rejects were high and uniformity was low because operators couldn't control distortion.

Edwards installed an electric, conveyorized brazing furnace designed by the American Electric Co. "The new furnace does a lot better work. It has eliminated waiting for red heat, and warping is no longer a problem. We think the furnace has paid for itself in six months," says A. E. Sharp, manufacturing vice president at Edwards.

• **Sequence Arrangement**—Brazing begins with a thorough cleaning. Joints are fluxed to control the flow of molten silver alloy and to prevent excessive oxidation. Preformed silver alloy is then fitted and the parts inserted into brazing jigs. Where possible, part designs are self-locating.

Trial runs solve the problem of finding the right amount and shape of preformed silver alloy for each joint. Operators begin with oversized quantities and pare them down until they get the right amount. Deliberate oversizing avoids gaps, and once standards are developed, they can be applied to similar jobs.

After cleaning and positioning, assemblies are put on a woven wire belt. At 1200° F, parts take 25 to 30 minutes to join and cool.

Removing the human factor improves the strength of the joining. Tests show that the bond far exceeds parent metal strength.

Edwards can braze as many as seven pieces in one pass. Output per manhour has climbed steadily since the furnace started operating.

production problem

Mass-production of modern "wonder alloys" might, in some respects, be compared with an attempt at assembly-line fabrication of Cellini's famed sculpture of "Perseus".

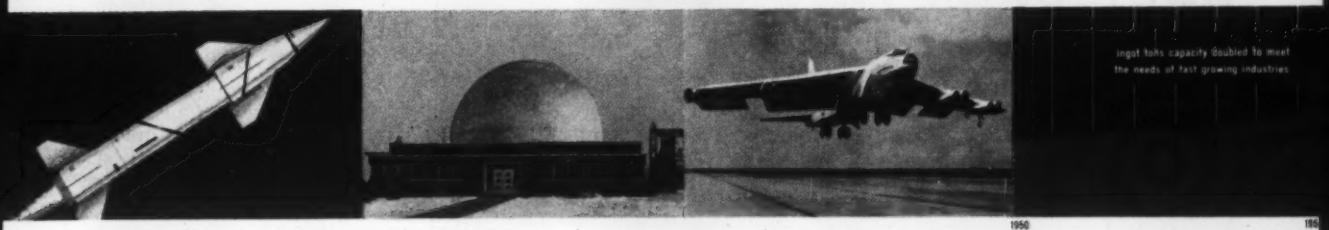
Both would require the careful precision, the intricate craftsmanship of experienced specialists, intimately familiar with ultra-modern production techniques.

Yet within the past year, high volume production of quality specialty steels has become a reality at *Carpenter. Ingot tonnage capacity*—the equipment and quality controls required to produce the world's finest steels—has *doubled almost overnight* through the acquisition of steelmaking facilities in Bridgeport, Connecticut.

For many years, demands by American industry for *Carpenter*-quality stainless, tool and alloy steels often exceeded our ability to produce. Like that of all custom-craftsmen, our objective was *quality*, the pioneering of new and better steels, rather than *quantity*.

Today, as the result of long-planned expansion, we can offer *quantity* along with famous *Carpenter quality*. For the first time, with our increased capacity, both quantity and quality are available. And both will continue to be available, even in times of peak demand.

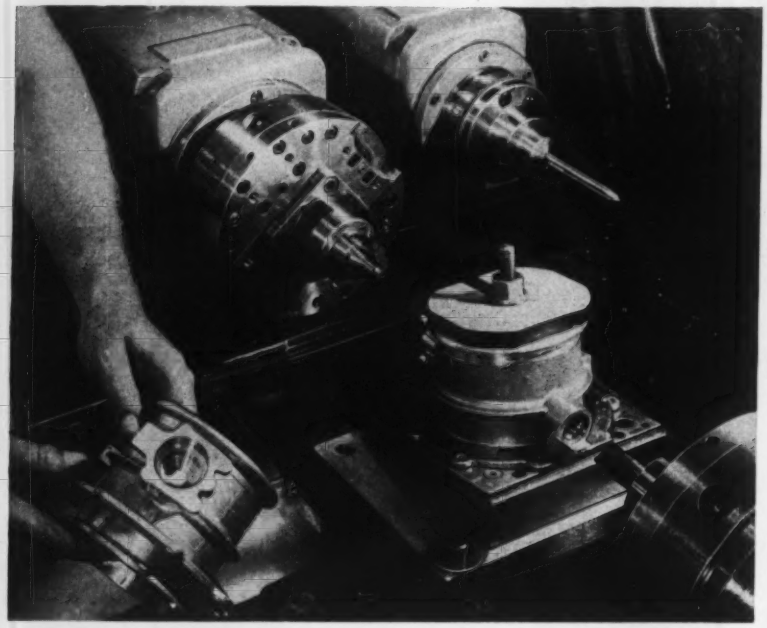
While *quality* will continue to remain a sacred *Carpenter* watchword, we are determined to lead the way and grow apace of the ever-increasing demands of industry for the world's finest specialty steels.



tool and die steels
stainless steels
electronic and magnetic alloys
special-purpose alloy steels
valve, heat-resisting and super alloy steels
tubing and pipe
fine wire specialties

Carpenter steel

The Carpenter Steel Company
Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.



Nickel alloy and aluminum parts for aircraft hydraulic and air systems meet all specifications, require no further finishing after multisurface machining

Boring Machine Saves Over $50,000 in First Year

WHEN YOU invest in new capital equipment, you often get your money back in short order through lower production costs and fewer scrap losses.

Example: Whittaker Controls Div., Telecomputing Corp., Lynwood, Calif., got a quick return on its investment when it replaced an old precision turret lathe with a Bore-Matic, made by Heald Machine Co., Worcester, Mass.

The Bore-Matic, used to machine nickel alloy and aluminum parts for aircraft hydraulic and air systems, cost $24,967. During its first year of operation, it saved $54,188 in production costs. That's almost $30,000 more than the cost of the machine. Whittaker officials expect savings in machining costs exceeding $50,000 annually to continue indefinitely.

• **Kept Record of Savings** — Machining costs were accurately documented by Whittaker's production engineers. A detailed performance report compared the cost of work done on the new machine with the cost of doing the same work on the turret lathe.

Twelve typical nickel alloy and aluminum parts were selected for the cost study. They represent about 26 per cent of all work handled on the new machine.

The parts are machined on multiple surfaces to tolerances of plus or minus 0.00025 in. One part that was honed after machining on the turret lathe now needs no honing.

Some savings were not calculated in dollars and cents. Example: Scrap losses were reduced from 20 to 2 per cent in the machining of a pump body.

Finishing System Is Placed on Roof

MORE THAN 30,000 sq ft of production space was reclaimed by housing the finishing system on the roof at Hamilton Mfg. Co., Two Rivers, Wis.

The system is used to finish Hamilton's line of metal equipment, which includes surgical furniture and clothes dryers. It was engineered and built by R. C. Mahon Co., Detroit.

• **Production Problem** — The size and layout of Hamilton's three story buildings offered an interesting problem: How could one finishing system serve several buildings?

The solution was to place the finishing system on the roof, and connect it to the areas it served with a network of conveyor tunnels.

• **Three Lines Used** — Three conveyor lines, loaded with parts to be finished, travel to one point in the system, and take parallel paths through a six stage cleaning and rustproofing machine. Lines then pass through a dryoff oven and into an air conditioned finishing area.

One line carries light gage clothes dryer parts that can be sprayed electrostatically. It passes through two automatic Hydro-filter spray booths for good coverage, then goes through a 30-ft booth, where reinforcing finish is sprayed on manually. Parts then go through an oven, where they're baked at 280° F for 45 minutes.

The line loops around a black finish spray booth, so that parts can be removed before entering the white enamel area, sprayed black, and hung on the same conveyor, traveling in the opposite direction. That permits black parts to complete the finishing cycle with white enameled parts.

One line carries large formed and welded units through an 87-ft booth, for manual spraying, then through a baking oven.

Another line carries formed and welded parts through the cleaning and rustproofing lines, then into the dryoff oven. Parts are then taken downstairs, where they are finished and baked.

• Bituminous coal contributes to plant operating profits by its *productivity* and *stability*. Virtually limitless supply, plus most modern mining methods, gears production to *any volume demand.*

Accessibility and increasingly efficient burning equipment mean economical, constant-cost for today and tomorrow.

B&O

B&O B&O B&O B&O B&O B&O

Ask our man! BALTIMORE & OHIO RAILROAD, BALTIMORE 1, MD., Phone: LExington 9-0400

Thrust brace barrel, made of seamless, vanadium steel tubing, is turned slowly in big, three-jawed chuck; metal is deposited between the end fitting and barrel

Better Tools and Methods Reduce Welding Rejects

Cracks and porosities, caused by stops and starts for rod changes, are avoided by using a continuous electrode and turning the work under the welding head

YOU CAN prevent cracks and porosities in welded joints, caused by stopping and starting the welding machine for rod changes, by using the right welding tools and techniques.

Such welding flaws have been almost wiped out in the manufacture of landing gear thrust braces at Ryan Aeronautical Co., San Diego, Calif. Unnecessary welding is avoided; all welds are made with a machine that feeds welding wire continuously as the work is turned slowly in a large chuck.

Thrust braces originally designed and built in four parts are now made in three by using seamless, vanadium steel tubing for the barrel. Work time per unit is one-tenth what is was.

• **Welding Creates Problems**—Previously, two half shells were welded together to form a 5 ft barrel. A welding machine, making short passes, welded the two end fittings in place.

Thorough inspection, including the use of Magnaflux and x-ray, disclosed cracks where the barrel halves were joined, and porosities where welds were started or stopped.

Hand Heliarc welding was tried, but slow speed caused overheating and porosity in the welds.

• **New Materials, Methods**—Seamless tubing, now used for the barrel, is swaged to receive end fittings.

Tubes and fittings are heated to 200° F and purged with argon in a portable preheat oven; temperature does not fall below 200° F during welding.

End fittings are tackwelded to the barrel in a special holding fixture. The thrust brace is then clamped in a chuck and turned slowly under the head of an automatic Heliarc welding machine, which fastens the end fitting permanently to the barrel.

The welding machine feeds a 1/16 in. welding wire continuously, at 5 to 8 in. per minute. Porosities caused by stopping and starting the machine for rod changes are eliminated.

The machine has a floating electrode head, which is electrically controlled. Voltage changes are compensated for when the welding head passes over tackwelds, or as the weld seam fills up.

Small valve body parts, in rotary files, are classified for three assembly phases

Office Files Solve Assembly Problem

Record handling equipment is used to store small parts. Assemblers walk less; floor space is used more efficiently; parts are protected from dirt and dust

OFFICE filing equipment adapted for the storage of small parts is speeding the assembly of valve bodies for automatic transmissions. The system is being used at the Indianapolis plant of a major transmission manufacturer.

• **Old Way Not Efficient**—Formerly, valve body parts were stored in baskets on a workbench. Assemblers walked along the bench, picked up the necessary parts, and made up the valve bodies. Time and effort were wasted, and exposure of parts to dust and dirt led to problems in final inspection.

• **New Way Is Faster**—To eliminate walking and reaching for parts, the company installed three, motorized, rotary files. (They were made by Diebold Inc., Canton, Ohio.)

Each file is fitted with 32 baskets for parts. The baskets are on eight trays. Parts are arranged in order of assembly. They're protected from dust and dirt until installation. When a foot control is actuated, the right parts are brought to workbench level.

The assembly procedure is divided into three phases; each file contains a specific number and type of parts. The assembler installs all parts from one file in the valve body, then passes it on to the next station. Parts from all three files complete the valve body.

Belts Defy Cutting Oils and Abrasion

Used on conveyors, they clean easily, withstand corrosive coolants, sharp edged castings

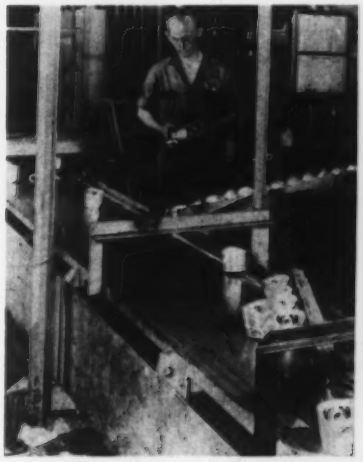
SHARP edged aluminum pistons and harsh cutting oils do little damage to Koroseal conveyor belts used at Ford Motor Co.'s No. 1 engine plant, Cleveland.

The heavy industrial belts, made by B. F. Goodrich Industrial Products Co., Akron, last over twice as long as those previously used.

• **Stands Hard Use**—One of the belts, used as a pan type conveyor, without idlers, carries piston castings from rough machining to finishing and inspection.

The belt maintains only a light surface contact with the pistons, but it has no trouble carrying them up a 30 degree incline.

Already in use for over a year, it is expected to give at least another year's service.



TOUGH CONVEYOR
. . . endures under adverse conditions

• **Others Failed**—Belts previously used lasted two to six months, failing under the gouging they took from the pistons and the corrosive action of cutting oils.

They were usually covered with grime from coolant reaction and oil contamination. That fouled a locating hole in the piston boss, slowing production. The new belt can be wiped clean quickly with a dry cloth.

ACHESON

dispersions digest

Reporting uses for

dag® BRAND DISPERSIONS

COLLOIDAL GRAPHITE, MOLY-SULFIDE, VERMICULITE, AND OTHER SOLIDS

SUPERIOR CASTINGS, LONGER DIE LIFE ATTRIBUTED TO 'DAG' DISPERSIONS

Die casters and molders are expressing a growing preference for Acheson 'dag' brand colloidal dispersions. The consistent high quality of these products and the multiple benefits they offer have obsoleted most other mold cavity coatings. As outlined below, Acheson dispersions greatly aid in the manufacture of more uniformly sound castings having smoother surface finishes, facilitate metal flow and parting, and consequently extend the effective service lives of the dies and molds on which they are used.

Acheson 'Prodag'®, spray-applied on permanent molds at Paragon Aluminum Corporation, has given them consistently higher quality castings and fewer rejects.

Better surface finish with 'Prodag' permanent mold coating is just one of the reasons why Paragon Aluminum Corporation, a Division of Detroit Harvester Company located at Monroe, Michigan, switched to this Acheson product. After four years of experimentation with other mold washes, Paragon chose 'Prodag' — Acheson semi-colloidal graphite in water — and has used it constantly the past seven years. The reasons for its choice are these; uniform consistency, excellent heat-transfer quality, and its hard, smooth, tenacious film which resists flaking and provides easier parting characteristics.

With about 95 per cent of its annual output of more than two million pounds of castings going to the automotive industry, Paragon must insist upon quality. 'Prodag' helps to maintain this standard. These parts for convertible automobile tops are precision-molded from both 355 and 319 aluminum alloy. Molds are preheated before each day's run to 600°F and the casting cycle maintains this temperature. The 'Prodag' dilution ratio is 1 to 4 parts water and is applied to the molds with a commercial spray gun. Aside from occasional touchup at points of greatest wear, this coating lasts through the entire run. Because of the physical contours involved in these comparatively small, light castings, they require rapid cooling in certain areas to insure uniform strength. The 'Prodag' coating — with its proven fast heat transfer ability — allows the castings to cool without breaks or pinholes. And by parting more easily, the high-finish castings which result have given Paragon Aluminum products wide acceptance in this demanding industry.

Typical parts cast at Paragon Aluminum include these automobile convertible top braces. More uniform strength, better finish, and fewer rejects result from this company's use of Acheson 'Prodag'.

Colloidal graphite increases die life because of its stability at high temperatures, excellent lubricating qualities, and its ability to prevent adhesion and the scrubbing effect of hot metal. This cannot be said of conventional petroleum compounds which either decompose rapidly at temperatures above 300°F or do not possess the required lubricity necessary under good die casting procedures. It will not volatilize when in contact with the hot metal and cause pock marks due to gas formation. It will perform when present in extremely thin films which will not affect dimensions or cause discoloration of the parts being cast. And since it does not volatilize or otherwise be destroyed in the casting process, it does not need to be applied as often as other lubricants. This fact alone has often increased production as much as 25%. Investigate the use of an Acheson colloidal dispersion in solving your die casting problem . . . *It probably is the very answer you need.*

If you have a metal casting problem, call in your Acheson Service Engineer. Or if you prefer, write direct for additional information contained in our Bulletin No. 425. Address Dept. S-39.

'dag' and 'Prodag' are trademarks registered in the U.S. Patent Office by Acheson Industries, Inc.

ACHESON *Colloids Company*

PORT HURON, MICHIGAN

A division of Acheson Industries, Inc.

Also Acheson Industries (Europe) Ltd. and affiliates, London, England

Offices in: Boston • Chicago • Cleveland • Dayton • Detroit • Los Angeles • Milwaukee New York • Philadelphia • Pittsburgh • Rochester • St. Louis

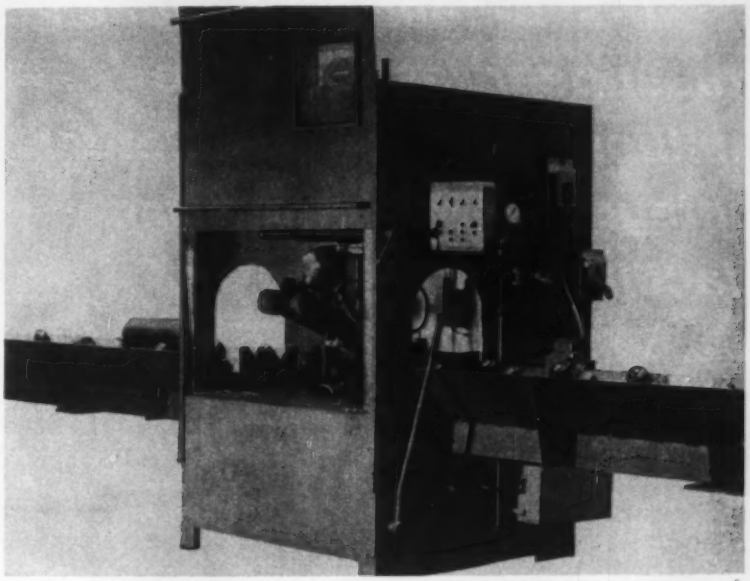
Pipe Cutting Machine Reduces Costs Up to 80%

THIS machine will cut 6 in., schedule 40, stainless steel pipe in 54 seconds, and bevel it in an additional 6 seconds. In other cases, the machine can do the job even faster, reducing pipe joint preparation costs by 20 to 80 per cent.

It will cut ferrous, nonferrous, and nonmetallic pipe from ½ through 16 in. sizes. Using a high speed abrasive saw and rotating the pipe during the cut prevents heat accumulation, which causes crystallization and oxidation, and eliminates the use of coolants.

Materials such as Hasteloy, stainless, mild steel, aluminum, and terra cotta can be indiscriminately intermixed on the cutting schedule with no loss of production time.

For more information, *write* James Mitchell & Co., 1134 Cooper St., Beverly, N. J.



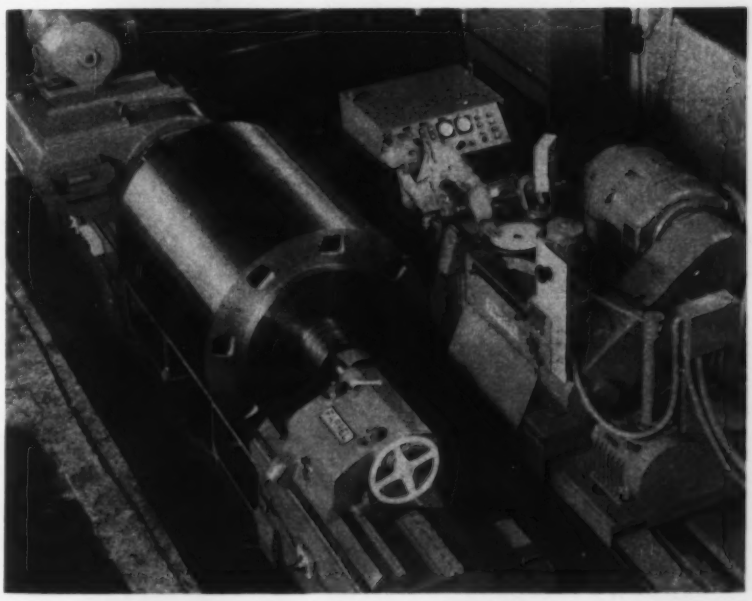
Machine Grinds Cylinders from 5 to 75 in. Diameters

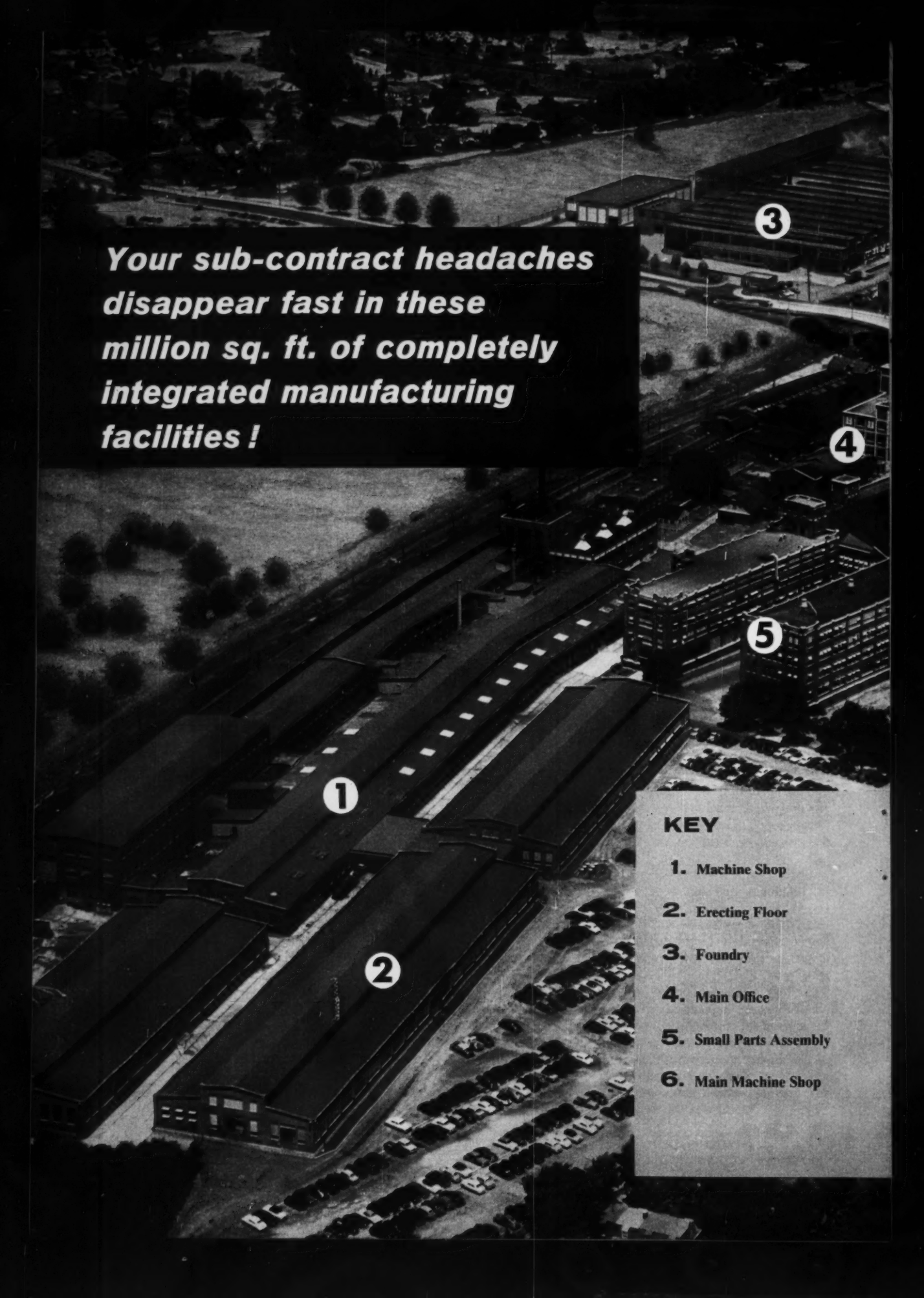
WHERE extreme accuracy in cylindrical grinding is required, this moving-wheel machine can be put to work. Concentricities of workpieces can be held within 0.0002 in.

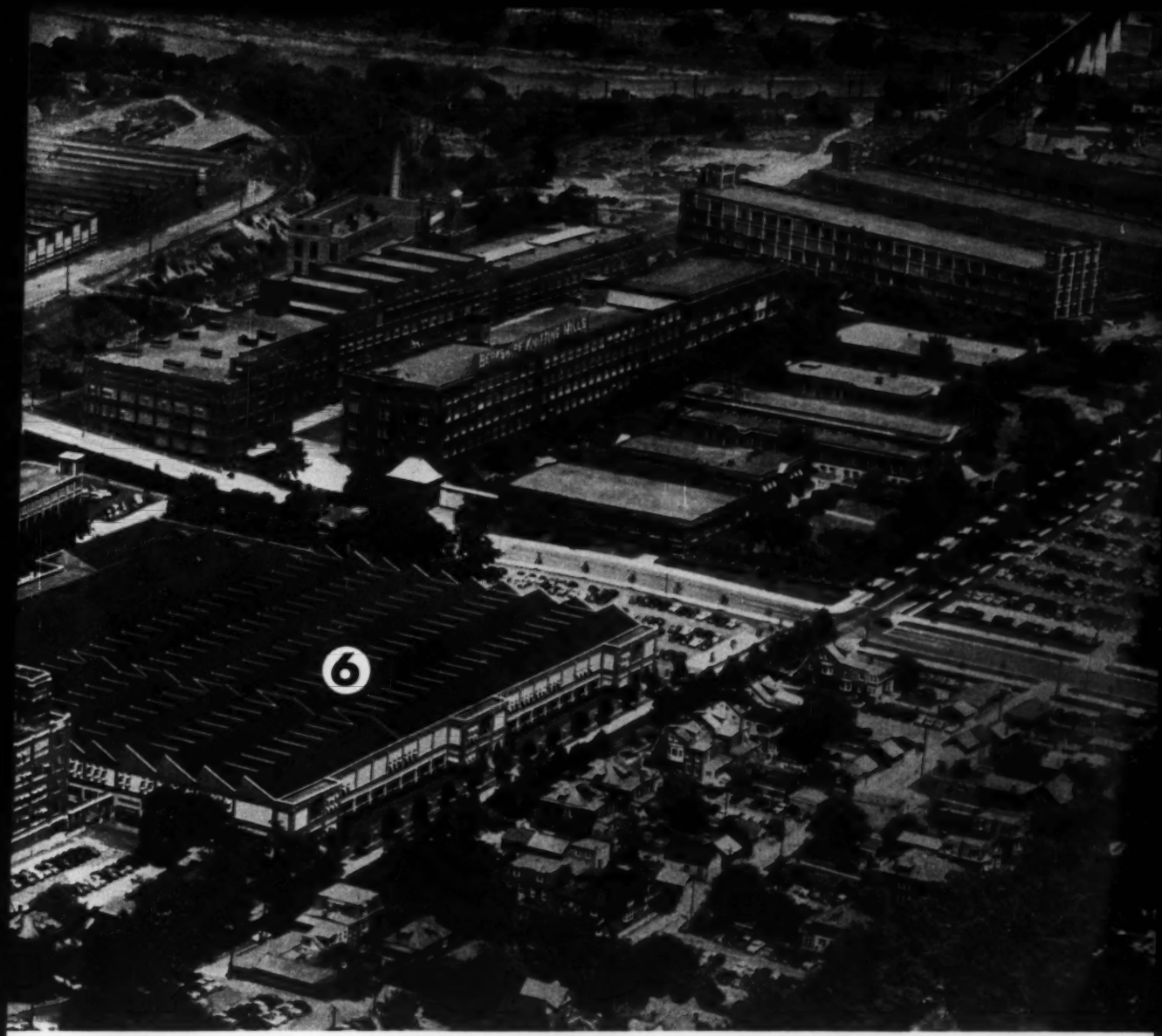
With a capacity range of 5 to 75 in. diameters and up to 12 ft between centers, the grinder can be used with many types of cylinders. To accommodate larger workpieces, it can be provided with a gap-type bed.

A large-diameter body and a small-diameter tapered journal can be ground in a single setup. Because the workpiece does not have to be moved to perform these two operations, there is important saving in time, as well as assurance of concentricity between the body and the journals.

Carriage reversal is controlled by micrometer adjustment and is ac-




Your sub-contract headaches disappear fast in these million sq. ft. of completely integrated manufacturing facilities !
1
2
3
4
5
KEY
1. Machine Shop
2. Erecting Floor
3. Foundry
4. Main Office
5. Small Parts Assembly
6. Main Machine Shop



Nothing's quite so important in sub-contracting as *single* responsibility . . . one single responsible source that you can depend on for quality, accuracy, and on-time delivery of your components, assemblies and complete machines.

You get all this when you work with one of the world's largest, most modern and completely integrated manufacturers, whose 65 years' experience in precision (tolerance to 10ths) manufacturing is available to you *now*, on either a short or long-term basis.

Textile Machine facilities include 1200 *modern* machine tools of all types and sizes, a completely mechanized foundry (one of the country's largest), 3000 skilled craftsmen, including a corps of the industry's top designers and engineers.

Combine these facilities with electronic punch card production scheduling controls and quality control techniques—and you've got the perfect answer to all your sub-contract problems . . . right *under one roof*.

For more details, or for latest Facilities File Folder, call or write:

TEXTILE MACHINE WORKS

Contract Division • Reading, Pennsylvania

curate within 0.005 in. for grinding up to shoulders. The headstock has infinite speed variation within a 10 to 1 range. The carriage and grinding wheel speeds can be varied through rheostat control.

For more information, *write* Farrel-Birmingham Co. Inc., Ansonia, Conn.

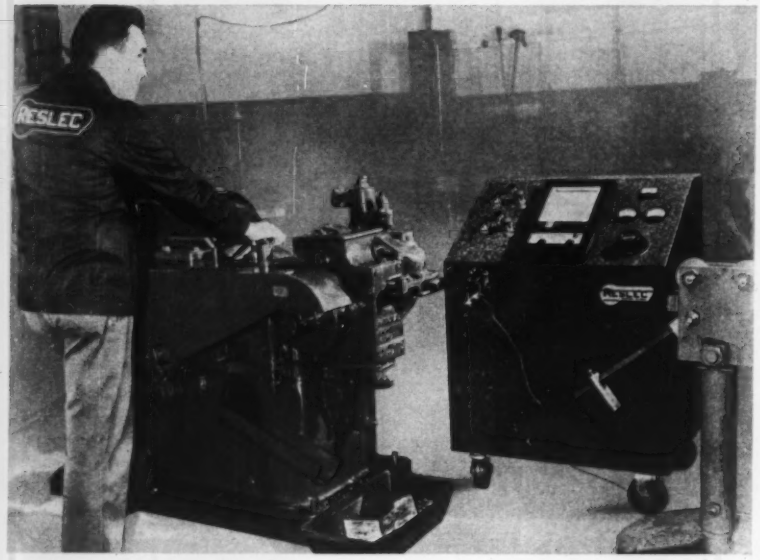
Air Washers Won't Corrode

FABRICATED of rigid polyvinyl chloride, these air washers will handle acids, alkalies, and corrosive fumes. They will clean 96 to 99 per cent of contaminants that are soluble in water, such as chromic acid, sulfuric acid, and caustics.

Available in capacities from 1000 to 54,000 cfm, the air washers have smooth, nonporous surfaces that offer less resistance to air flow and will not absorb water.

The unit has a three-way action: 1. Air is sprayed with water. 2. A wetted ring-type washer bed changes air direction at least eight times for complete cleaning. 3. An eliminator section removes particles of heavily entrained water.

For more information, *write* Industrial Plastic Fabricators Inc., Endicott Street, Norwood, Mass.



Work Heaters Boost Tool Life

INCREASES in tool life on heading operations, punch presswork, and impact forming of 300 to 700 per cent before redressing or replacement are possible through the use of electric resistance heaters in processing metals.

The portable units can also be used in wire drawing, extruding, forging, roll threading, other roll forming processes, heat treating, and heating strip stock prior to shearing.

The basic circuit consists of a transformer which is controlled by a saturable core reactor. A temperature sensing head allows unusually accurate temperature control of the part being heated.

The photograph shows the Herscott Reslec unit applied to a screw heading machine. The low voltage, high amperage current is introduced directly to the wire to heat it. In forming, shearing, and presswork, the resistance heater is connected to the machine and a set of rollers. Metal is heated when it passes between the two hookup points.

For more information, *write* Herscott Co. Inc., 2500 N. Main St., Rockford, Ill.

Cleaner Also Phosphates

YOU CAN clean the surface of ferrous metals, zinc, and cadmium at the same time as you apply an amorphous iron phosphate coating.

Use of Ty-Bond R-1 provides an economical method of removing light oils and shop dirt from fabricated metal parts and phosphating them to increase paint adhesion and give corrosion protection. Phosphate coating weights up to 60 milligrams per sq ft are possible.

For more information, *write* Cowles Chemical Co., 7016 Euclid Ave., Cleveland 3, Ohio.

Furnace Heats Thin Work

HEAT TREATING of large, thin workpieces is easily accomplished in the Waltz flattening and tempering furnace.

Work is placed in the chamber between two 42 in. circular cast iron dies. The bottom die rests on the steel structure of the furnace, but is not rigidly fastened. The top die is fastened to the bottom end of a cylinder with a ball-and-socket joint. A Vickers hydraulic unit supplies power to the cylinder.

The furnace is a gas fired, recirculating type. Temperature range is 350 to 1000° F. For more information, *write* Dept. 9, Waltz Furnace Co., 1901 Symmes St., Cincinnati 6, Ohio.

Air Tracer for Lathes Handles Complex Jobs

COMPLEX turning, boring, and facing operations can be eased by adding the self-contained Air-Gage Tracer to your Monarch lathe. Designed for field installation, it can be used on lathes in the 60, 61, and 62 series.

The tracer slide assembly mounts on the cross slide in place of the regular compound rest. The template support is clamped to the front bed V-way. Longitudinal and cross adjustment of the template position are made with micrometer dials.

The portable, self-contained power unit stands at the front of the machine. The hydraulic pump motor operates on 110 volts. A con-

Hoover announces 3L00 extra light bearings

Now, America's quality bearings come in compact proportions designed to save space! Hoover's new 3L00 series extra light ball bearings provide the solution to bearing problems calling for maximum bore size and minimum housing area. They have outer diameter and width dimensions that are substantially smaller than those of standard light, medium or heavy series bearings of equal bore size.

Hoover 3L00 extra light ball bearings are available in a wide range of popular sizes in open, shielded and sealed types, including lubricated-for-life bearings with Hoover-developed contact seals of TEFLON. For complete information, return the coupon below.

Hoover quality is outstanding!

Micro-Velvet balls are made of selected high-carbon chrome alloy steel, uniformly hardened, and finished so perfectly that roundness and diameter are accurate within millionths of an inch.

Hoover Honed raceways, on both inner and outer rings, are super-smooth, superbly finished. Precision matching of ball complements and raceways assures hushed quietness, long life, superior Hoover performance.

Micro-Velvet and *Hoover Honed* are Hoover trademarks. TEFLON is a DuPont trademark for its fluorocarbon resins.

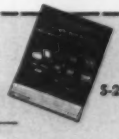
hoover

BALL AND BEARING COMPANY

5400 South State Road, Ann Arbor, Michigan
Los Angeles Sales Office and Warehouse:
2020 South Figueroa, Los Angeles 7, California

Hoover Ball and Bearing Company
5400 South State Road, Ann Arbor, Michigan

Please send new Bulletin 108, which describes Hoover 3L00 extra light bearings.



S-2

Name_____

Title_____

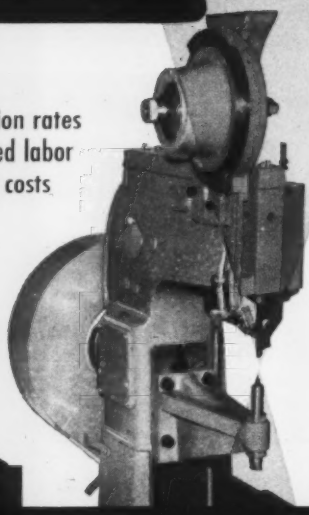
Company_____

Address_____

City_____ Zone_____ State_____

Odd shapes are no problem for the new Townsend Model 75 Tubular Rivet Setting Machine

High production rates using unskilled labor cut fastening costs



Skillfully designed tooling gives complete versatility to the new Townsend Model 75 Tubular Rivet Setting Machine. A variety of specialized tooling is available to equip the Townsend machines for any size and shape of work.

Townsend tubular rivets are available in steel, aluminum, copper, brass, nickel-silver and special materials for use in joining anything from cloth to steel sheets. Thus, Townsend makes available the economies of tubular rivet fastening for a wide range of products in a number of different materials. Townsend's experienced fastening engineers provide application design service.

If you wish to enjoy the economies of fastening with tubular rivets, write for complete information on the versatile Model 75 Setting Machine and the complete line of Townsend tubular rivets. Townsend Company, P. O. Box 237-C, New Brighton, Pa.

The Fastening Authority

Townsend

COMPANY • ESTABLISHED 1816

Sales Offices in Principal Cities

In Canada: *Parmenter & Bulloch Manufacturing Company, Limited, Gananoque, Ontario*

NEW PRODUCTS and equipment

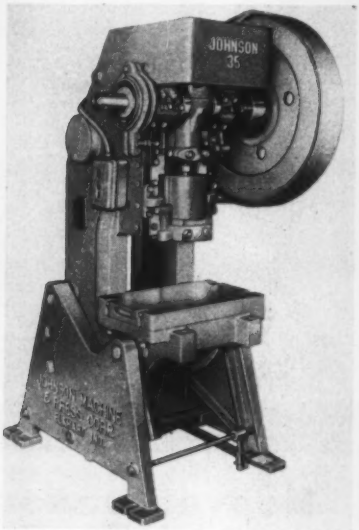
nection is attached to the base for the air supply.

For more information, *write* Monarch Machine Tool Co., Sidney, Ohio.

Press Has One-Piece Frame

BY MAKING the "box top" an integral part of the main frame casting in this 35-ton open back inclinable press, the builder has added support to the crankshaft bearings and reduced harmful deflection.

The frame is cast in high tensile iron. The press is available in conventional flywheel or backgeared



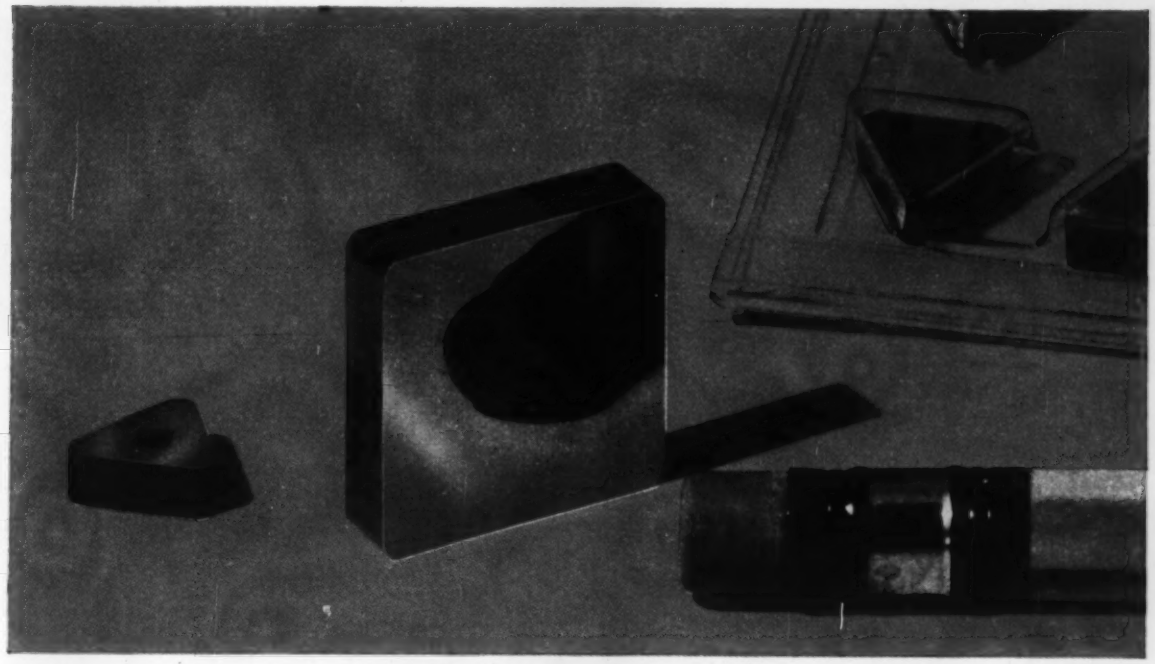
styles, and can be equipped with the Johnson pin clutch or the Wichita air friction clutch.

Main bearing caps are split on a 30 degree angle to allow the frame to absorb shock load. Crank strokes range from 2½ in. to 6 in.

For more information, *write* Johnson Machine & Press Corp., Elkhart, Ind.

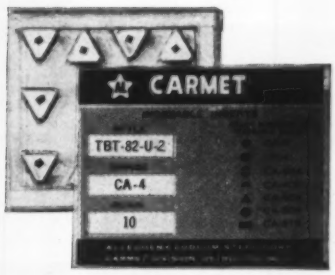
Conveyor Makes into Unit For Polishing, Brushing

BY ADDING polishing, buffing, or brushing heads to this straight line conveyor, you can build an efficient surface finishing machine. It's made in several belt widths and



CARMET INDEXABLE INSERTS NOW LAPPED TO A MIRROR FINISH

to reduce chip wear and increase tool life



New Handy Plastic Slide Package

Individual pockets of heavy gauge, clear acetate now make it easy to check your Indexable Insert stock. Slides open for instant dispensing. Cardboard back carries Style, Grade and Quantity numbers plainly stamped. An index of grade markings of Indexable blanks for quick identification is included.

WRITE FOR FREE CATALOG C-16
"Carmet Cemented Carbides for Industry"

This 32-page first edition has prices and complete specifications on Carmet's full line of cemented carbide tipped tools, Indexable Inserts, blanks and holders. Speed and feed charts, grade comparisons, ordering information included.

ADDRESS DEPT. S-141

Here's another Carmet "first" that cuts machining costs. Top surfaces of Carmet Indexable Inserts in all grades are now lapped with a super-fine grit diamond wheel to a bright mirror finish. And prices stay the same.

Chips just slip by on contact, so cratering and chip wear are reduced to a minimum. This low micro-inch finishing makes cutting edges stronger, too. Burrs and feather edges that contribute to early chipping are actually honed away. Cutting is cooler and more even. The tendency of some materials to stick is greatly reduced. Seating of the insert is highly improved to minimize the hazard of breakage when clamping.

Your Carmet distributor has Indexable Inserts in stock. He knows carbide tooling. Call him for any information you may want on grade selection, tool design or tool holder styles to make your current jobs more profitable. Or write Allegheny Ludlum Steel Corporation, Carmet Division, Detroit 20, Michigan.

WSW-7401

CARMET

CEMENTED CARBIDE DIVISION OF
ALLEGHENY LUDLUM STEEL CORPORATION

Punches & Dies

Since 1903

Made to highest standard and uniform quality thus insuring maximum service.

In Stock

Round, Square, Oblong Punches and Dies, Rivet Sets

Write Dept. A for catalog 60 and new stock list

GEO. F. MARCHANT COMPANY

1420-34 So. ROCKWELL STREET · CHICAGO 8, ILLINOIS

. . . for the right answer to your fastener problems

FULL LINE

Cap Screws, Carriage, Machine, Lag, Tap and Plow, Step-Elevator, Stove, High Strength, Anchor, Nylok, SpinLok, Place and Special Bolts

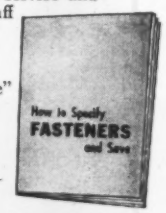
QUALITY IN QUANTITY

From billet to bolt, from our own rolling and wire drawing mills to final inspection — our fasteners are produced by modern equipment to closely controlled standards.

SERVICE

Two modern plants, Three convenient District Sales Offices, Specialized engineering service and an experienced field staff assure satisfaction for any requirement.

BOLTS AND NUTS



Write for brochure... "How To Specify Fasteners and Save"

Phone or write for our quotes on your fastener requirements.

BUFFALO BOLT COMPANY

Division of Buffalo-Eclipse Corporation

Plants: North Tonawanda, New York and Princeton, Illinois

DISTRICT SALES OFFICES

CHICAGO, ILLINOIS — 1534-35 Monadnock Bldg. — HArrison 7-2178

NEW YORK CITY — 50 Church Street — REctor 2-1888

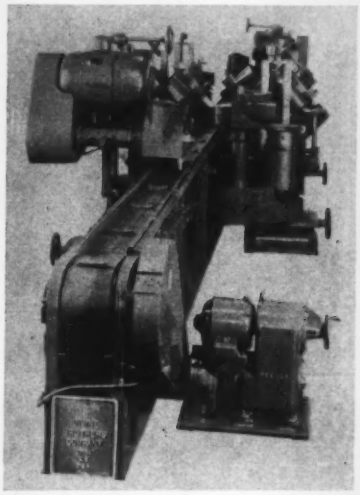
NORTH TONAWANDA, N.Y. — 101 East Avenue — JAckson 2400 (Buffalo)

Company Salesmen in all principal centers

NEW PRODUCTS and equipment

over-all lengths to accommodate a wide range of workpieces.

Optional equipment includes wheel station platens for work which must be maintained flat and straight; reciprocating and progressing conveyor control for use when pro-



duction requirements are low and it is desirable to operate with a reduced number of wheel units.

The standard conveyor comes with a motor and variable speed transmission unit mounted on the unloading end. For more information, *write* Machinery Div., Divine Bros. Co., Utica, N. Y.

Triple Salt Bath Furnace Designed for Toolrooms

DEVELOPED for limited quantity production of high speed tool steels, the Model 230 salt bath furnace offers these important user benefits:

No scale at any temperature; uniform heating and hardening with thin or heavy workpieces; minimum distortion; less finishing time. Many types of tools, such as form tools, hobs, and taps, can be hardened to size without having to be finished.

The furnace has three pot units: 1. A preheat, gas-fired alloy pot for hardening and preheating any type high speed steel from 1300 to 1800° F. 2. A high heat, two-electrode ceramic pot with a temperature range of 1750 to 2350° F for treating high carbon, high chrome, and

FREE DATA FILES

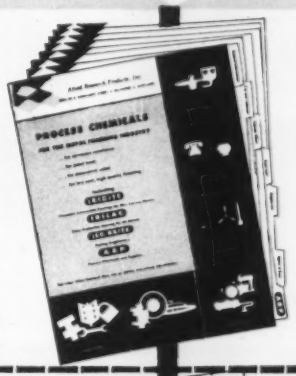
on

Allied Research LINES

LOOK FOR THE DIAMONDS—SIGN OF FINISHING QUALITY

METAL FINISHING PROCESSES

A complete line of quality products and processes developed primarily as a result of helping manufacturers like yourself solve their metal finishing problems. If one of our present products does not meet your needs, we'll be glad to work with you to find an answer to your problem.



IRIDITE® Chromate Conversion Coatings for Non-Ferrous Metals.

IRILAC™ Clear Protective Coatings for All Metals.

ISOBRITE® *Chemically Different* Plating Brighteners.

ARP® *Process chemicals.*

EQUIPMENT AND COMPLETE SYSTEMS

for Metal Finishing

Process Engineered—Single pieces of equipment or all equipment necessary for a finishing operation—evaluated, designed, fabricated, installed and tested to match exactly your particular process. Ask about our *Process Engineering Service.*

WAGNER RECTIFIERS

Silicon and Selenium, built to exacting specifications for long life, trouble-free service.

WAGNER AUTO-LOADERS

for fast, economical transfer of racks and parts, conveyors to plating machines, between conveyors.

AUTOMATIC AND SEMI-AUTOMATIC PLATING MACHINES

BARRELS, TANKS and other equipment.

CHEMICALS AND SUPPLIES

Prompt service on a wide variety of daily-use necessities for the plating room, delivered from warehouse stocks strategically located in cities in metalworking areas.

FLAT-TOP® **ANODES**

in copper and zinc.

LECTROCOP® **FLAT COPPER ANODES**

CADMIUM, WHITE BRASS AND TIN ANODES in most efficient shapes. Acid Replacements, Buffs, Chemicals, Cleaners, Maintenance Materials.

NICKEL RECASTING SERVICE

Ask your Allied Field Engineer about our Subscription Plan which combines your new nickel purchases with a service to recast *your* butts and spears, resulting in substantial savings.

Allied Research Products, Inc.

4004-06 EAST MONUMENT STREET
BALTIMORE 5, MARYLAND
Branch Office: 400 Midland Avenue, Detroit 3, Michigan

Chemical and Electrochemical Processes, Anodes, Rectifiers, Equipment and Supplies for Metal Finishing.

WRITE TODAY FOR COPIES of these useful files describing technical details of our complete line, OR, phone your Allied Field Engineer. He's listed under "Plating Supplies" in your 'phone book.

Sonic testing, employing high-frequency sound waves, is one of several methods for detecting internal flaws in steel. Above, an open die-forged shaft is being sonic tested prior to shipment for use in a gyratory crusher.

Quality control—a vital activity at Standard Steel Works

Every conceivable shop and laboratory test required for modern quality control can be performed by Standard's staff of metallurgical technicians. Testing of incoming raw materials for undesirable elements, testing of finished product for minute quantities of gas, ultrasonic, X-ray and microscopic examination, and tests for dimensional integrity are but a few of the routine checks which assure that the finished, delivered product will meet the most rigid specifications. Write Department 2-B for full details.

Standard Steel Works Division

BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

air hardening steels. 3. A gas-fired, pressed steel pot for quenching at 1000 to 1450° F heat levels. All are neutral salt baths.

For more information, *write* A. F. Holden Co., Detroit, Mich.

Reducers Have Wide Use

WITH reduction ratios of as much as 100:1, the Reuland Multi-Drive Motoreducers can be used on cranes, hoists, and conveyors, as well as other installations where operating cycles vary from delicate, precise movements to fast operating speeds.

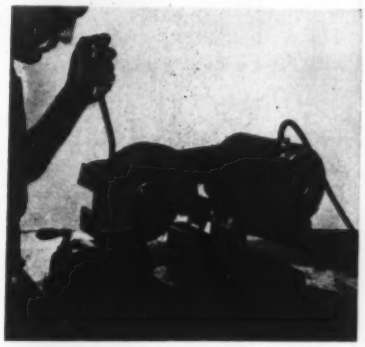
The package consists of a primary motor and a motoreducer connected by a direct current clutch and a common driveshaft. The primary motor provides the high speed output, the motoreducer the low speed output.

For more information, *write* Reuland Electric Co., Alhambra, Calif.

Cutoff Saw Holds Within 0.003 in. Parallelism

AN UNSKILLED operator can cut ferrous, nonferrous, and plastic materials within 0.003 in. parallelism with a new cutoff saw that's priced below $300.

The spindle and vise of the machine are integral parts of the same casting. Special machining and



Now you can do both . . .

SHORT RUNS LONG RUNS

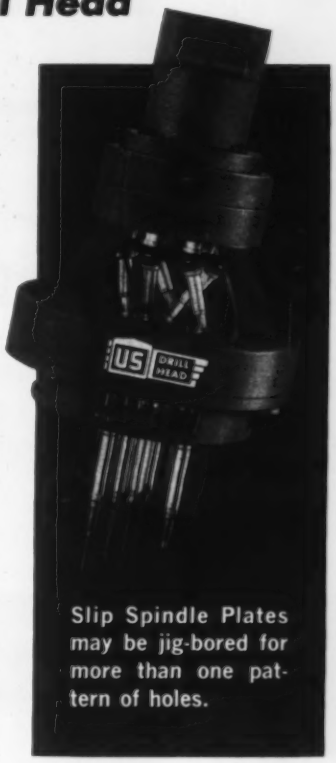
. . . Drilling and/or Tapping . . .

with ONE adjustable U. S. Drill Head

Complete versatility for job shop operations with standard adjustable arms . . . or, equip these heads with U. S. Slip Spindle Plates which are jig-bored for positive alignment to fit the hole pattern. Eliminates trial-and-error in set up.

Double Duty Tools — when your drilling machine has a reversing spindle, you can drill and tap the same hole pattern with one head.

U. S. Drill Heads are fast and rugged — designed and built for profit-making performance Positive all-gear drive with shaved gears, anti-friction bearings, and oil-tight housings assure smooth and accurate operation.



Slip Spindle Plates may be jig-bored for more than one pattern of holes.

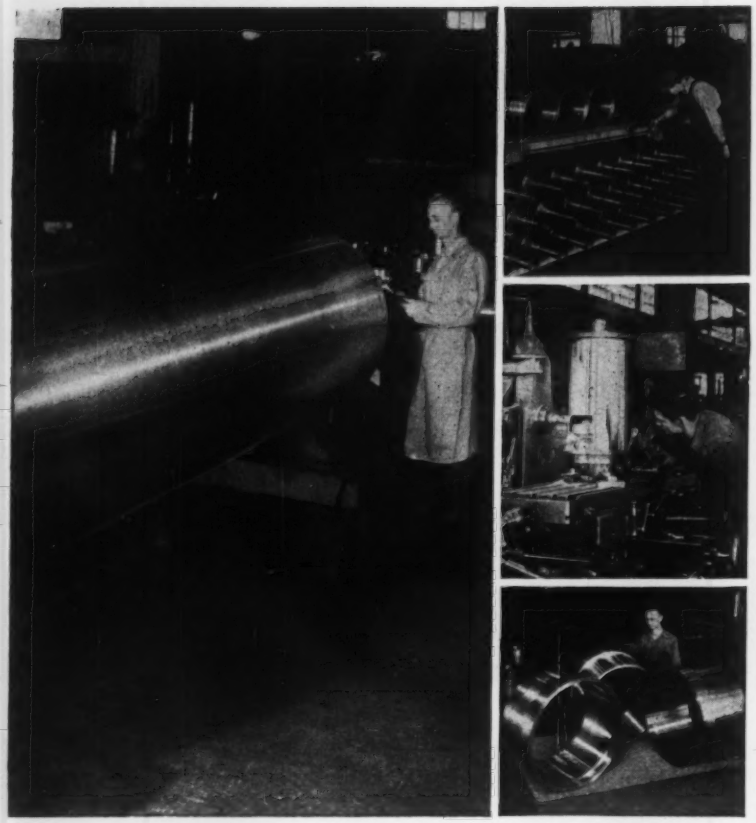
Ask for Catalog AD-57, or send specifications of your requirements.

US DRILL HEAD

Adjustable and Fixed Center Multiple Drilling Heads.
Individual Lead Screw Multiple Tapping Heads.

UNITED STATES DRILL HEAD CO.

BURNS STREET • CINCINNATI 4, OHIO



You'll find them better for pressure if they're

SHENANGO CENTRIFUGAL CASTINGS

WHATEVER the inside or outside pressures, Shenango centrifugal castings are better able to withstand them without failure.

Parts cast by the Shenango centrifugal process are much tougher because their finer, *pressure-dense* grain avoids stress concentrations while providing greater strength, better elongation and freedom from such costly defects as sand inclusions, blowholes and such.

Whether you need rings, rolls, sleeves, liners, bushings, bearings, mandrels or *any* annular or symmetrical part . . . ferrous or non-ferrous . . . in whatever shape, size or dimension to meet your requirements . . . Shenango can do the job. And do the job *better!*

For informative bulletins on the answers to your tough problems, it will pay you to write now to: *Centrifugally Cast Products Division,* The Shenango Furnace Company, Dover, O.

SHENANGO CENTRIFUGAL CASTINGS

COPPER, TIN, LEAD, ZINC BRONZES • ALUMINUM AND MANGANESE BRONZES
MONEL METAL • NI-RESIST • MEEHANITE METAL • ALLOY IRONS

checking methods permit final alignment of cut to within 0.001 in. in all planes of the cutting operation.

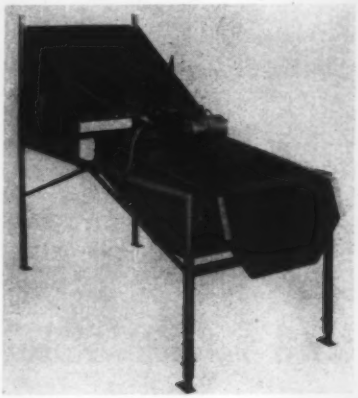
Most materials can be cut with one of two blades and at one speed.

For more information, *write* Navan Products Inc., a subsidiary of North American Aviation Inc., Los Angeles, Calif.

Vibrator Aids Separation of Barrel Finished Parts

FASTER, more efficient separation and screening of barrel-finished parts and abrasive media are possible with this machine.

It has a built-in, high frequency, low amplitude vibrator for the screening mechanism.



A screening surface 18 in. wide and 48 in. long provides a greater work area than earlier types, handling a wider range of parts and media sizes and shapes.

The machine takes all standard screen mesh sizes. The vibrating unit is shock mounted to dampen vibrations in the separator. Holding bolts are not needed to keep the machine from walking.

For more information, *write* Roto-Finish Co., Kalamazoo, Mich.

Machine Grinds Tools To Close Tolerances

YOU CAN grind carbide and hard metals to close tolerances with the Type D hand feed surface grinder. Built for general toolroom work, the

Sam: this may solve Transmission problem.

GREENLEE

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
- Six and Four-Spindle Automatic Bar Machines
- Hydro-Borer Precision Boring Machines
- Core Box Rollover and Draw Machines
- Die Casting Machines

GREENLEE OFFERS . . .

COOPERATION FOR AUTOMATIC PRODUCTION

The emphasis is on cooperation at Greenlee. Your ideas are added to Greenlee's. One idea sparks another. The result . . . the creation of machines that will meet your requirements efficiently . . . economically . . . now and in the future. Top-flight Greenlee engineers help you avoid costly mistakes. Their thinking is sound . . . respected. Call Greenlee. Let them give you the complete story on cooperation for automatic production.

MACHINES DESIGNED WITH THE FUTURE IN MIND

GREENLEE BROS. & CO.

1746 MASON AVENUE
ROCKFORD, ILLINOIS

Joe: these people have a lot of machines in Detroit look them over and let me have your reaction - Sam

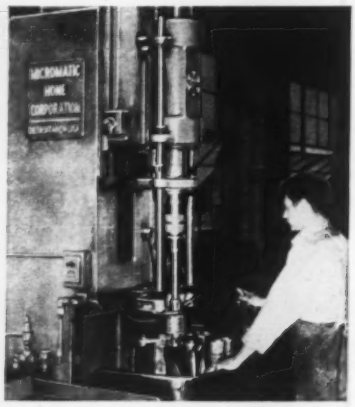
WHY MICROHONING*

OF GUIDE PIN BUSHINGS ASSURES FUNCTIONAL PRECISION, LONGER LIFE, LOWER COSTS

Lamina Dies and Tools, Inc., a pioneer in the development of bronze-plated guide pin bushings (bronze is electroplated on hardened steel for combined strength and smoother action), required a processing method that would economically produce bushing bores having dimensional precision, accurate geometry, functional surface characteristics, and consistent duplication to exacting specifications in every bushing.

In developing processing methods for the bushing bores, Lamina engineers found that Microhoning is best for generating final precision and functional surface characteristics at lowest cost per bushing.

Bronze, bronze-plated or steel bushings from ¾" to 4½" in diameter are Microhoned on this Hydrohoner. Stock removal is from .001" to .003" and average unit cycle is 30 seconds. Machine is equipped with automatic size control and tool expansion.



Characteristic cross-hatch lay pattern

Why? Because Microhoning generates a round, straight cylinder along the neutral axis of the bore; size and geometry of bushings up to 2½" in diameter are held to .0001" tolerances; contact area between bushing and guide pin is 25% greater than obtainable by other final processing methods. In addition, the characteristic cross-hatch lay pattern generated by Microhoning provides a "built-in" lubrication system in each bushing bore. This combined with the clean-cut surface prevents seizure or scuffing during operation of bushing. Finally, the self-dressing action of Microhoning abrasives assures continuous cutting efficiency and identical geometry, dimensions and surface finish in every bushing bore.

Thus, Lamina realizes, through Microhoning's generation of quality surfaces and precision bores, the full performance potential of bronze, bronze-plated or steel guide pin bushings—longer life, smoother action, lower costs.

Learn how Microhoning provides efficient stock removal, closer tolerances and functional surfaces—SEND FOR FREE LITERATURE.

**Registered U.S. Patent Office*

MICROMATIC HONE CORP.

8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

machine combines ruggedness and rigidity with sensitivity and easy operation.

Vertical capacity is 14 in. under a 7 in. wheel when using a wet grinding attachment. Total work area is 6 x 18 in.

A 5-in. table movement per one turn of the handwheel speeds the work and improves the quality of the finish grind. Antifriction ball nuts and screws in the cross feed keep the wheel from creeping away from the work in shoulder grinding.

A new stop dog arrangement, consisting of a casting anchored to the table with a swing-out stop for table dog contact, makes it possible to move quickly to a wheel dresser and return to the initial stop position.

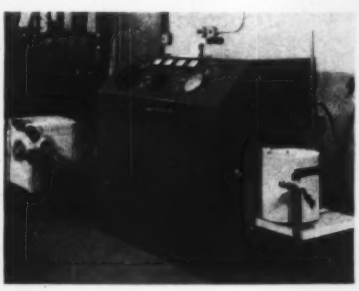
For more information, *write* Thompson Grinder Co., Springfield, Ohio.

Induction Melting Unit: 2 Hour Installation

SPACE SAVING and central control are the advantages of a console panel that contains the power source, controls, and all components necessary to operate high frequency induction furnaces and coils.

More than 20 capacitor and eight transformer steps provide the flexibility to assure matching full power to all varying load conditions during melting or heating cycles. Some recommended applications are floor-mounted furnaces up to 100 lb capacity, hand-pour furnaces, vacuum furnaces, sintering, and hot pressing.

Called the Integral 30, the unit has a 30 kw motor-generator set, a high frequency transformer, all necessary auxiliaries. It can be installed by connecting to a 220 or 440 volt

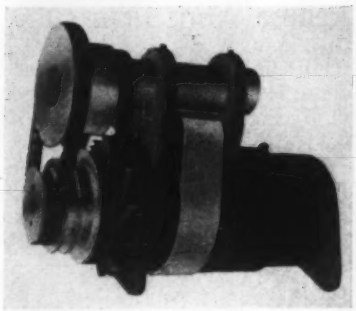


power source, a cold water line, and a drain.

By mounting it on casters, it can be used wherever the power and water are available. For more information, *write* Inductotherm Corp., 412 Illinois Ave., Delanco, N. J.

Generator Overdrive Keeps Battery Fully Charged

BATTERIES in vehicles powered by gasoline engines can be kept fully charged with an overdrive unit that maintains a constant generator output even when the engine is idling for long periods.



Gen-O-Drive increases generator speed when engine speed drops.

It is easily attached to any automotive-type generator, requires less than ¾ hp to operate. It combines maximum current availability with constant voltage regulation to prevent battery overcharging and preclude sudden surges of high voltage.

For more information, *write* Consolidated General Products, P. O. Box 7425, Houston 8, Tex.

Automatic Air Filter Has Electronic Precipitator

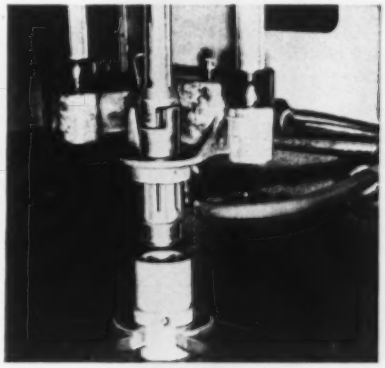
THE HIGH efficiency of an electronic precipitator and the low maintenance of a renewable media filter are combined in the Type B Rollotron.

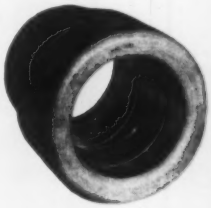
Dry, electrostatically charged plates are used to agglomerate dirt, bacteria, pollen, smoke and other contaminants. The particles are held together by intermolecular at-

HOW MICROHONING* OF GUIDE PIN BUSHINGS PROVIDES FUNCTIONAL PRECISION, LONGER LIFE, LOWER COSTS

HERE'S HOW Lamina Dies and Tools, Inc. uses Microhoning to generate final precision and functional surface characteristics in bushing bores at minimum cost.

Microhoning's low-velocity, controlled abrading technique removes a minimum of the bronze plating to obtain accuracy and functional surface characteristics. Thus, as much as possible of bronze plating is conserved and a uniform thickness of bronze throughout the bore is assured.





Above is a typical Lamina guide pin bushing. These bushings range in diameter from ¾" to 4½". An air operated, three-jaw fixture rigidly holds the work piece and is easily adapted to bushings of any size.

Because Microhoning tools have universal joints, they follow the neutral axis of the bore in generating round, straight cylinders. Since the bore location remains unchanged, concentricity between bushing I.D. and O.D. is obtained.

The combined reciprocating and rotating motions of the Microhoning tool creates on the bore surface a cross-hatch lay pattern that functions as a "built-in" lubricating system. For, the multitude of minute, diamond-shaped plateaus—over which the load is evenly distributed—are separated by a network of valleys that holds the lubricant. This better method of lubrication plus the clean-cut Microhoned surface prevent seizure or scuffing of bronze, bronze-plated and steel bushings. And, the self-dressing action of Microhoning abrasives maintains cutting efficiency to assure the same surface finish is developed in every bushing bore.

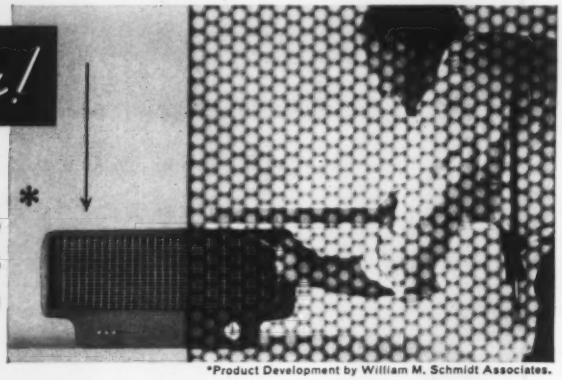
Learn how Microhoning provides efficient stock removal, closer tolerances and functional surfaces—SEND FOR FREE LITERATURE.

*Registered U.S. Patent Office

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

Idea!

mock-up projects design



*Product Development by William M. Schmidt Associates.

with H & K perforated metals

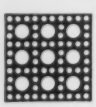
A few of the thousands of H & K patterns are illustrated in reduced size

Here is an H & K perforated metal grille utilized in a mock-up of a record player. This greatly helps the Industrial Designer project his concepts as H & K perforated metal is now in its proper element for consideration of use and selection of pattern.

By referring to the H & K General Catalog, the designer can select one or more patterns for his project.

H & K perforated metals provide the Industrial Designer, and other men of ideas, a medium of unlimited opportunities for designing better and more attractive products.

Send today to nearest H & K office for General Catalog

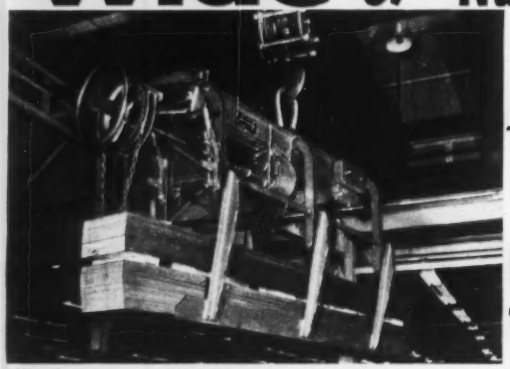


THE Harrington & King PERFORATING CO. INC.

Chicago Office and Warehouse
5627 Fillmore Street
Chicago 44 Illinois

New York Office and Warehouse
118 Liberty Street
New York, New York

Wide or Narrow...

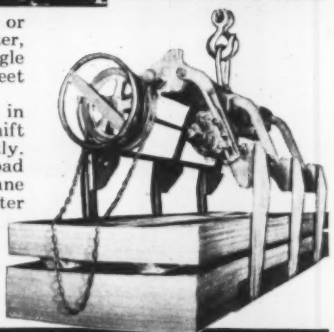


1 C-F LIFTER HANDLES THEM ALL

Whether your production requires a few or many widths of sheet steel, 1 C-F Lifter, with its wide range of jaw and carrying angle adjustments will probably meet all your sheet handling requirements.

Adjustments are made by the operator in a few seconds, permitting the Lifter to shift from wide to narrow sizes almost instantly.

Because it can pick up, carry and unload more loads per hour, using less man and crane time than any other method, a C-F Lifter will soon pay for itself.



Bulletin SL-30 gives you the complete story of C-F Lifter advantages to you. Ask for it today. There's no obligation.

CULLEN-FRIESTEDT CO.
1308 South Kilbourn Avenue • Chicago 23, Illinois

traction until they are picked up by the air stream and deposited on a filter that is automatically wound into a compact roll for easy disposal.

Resistance to airflow is uniform and constant, and filter performance is always at the optimum level regardless of job conditions. Since it is not necessary to wash the precipitator plates, freezing problems are eliminated.

For more information, *write* Dept. PD, American Air Filter Co. Inc., 215 Central Ave., Louisville 8, Ky.

Machine Tracer Drives Reduce Work Time 75%

THIS line of machine tool tracer drives is built in three types to meet all tracing requirements: Single axis, dual axis, and full two axis travel.

Called Reliance V-S Tracer Drives, the units are used where high volume, repetitive parts are produced. The manufacturer says they can cut machining time 75 per cent.

Each drive unit consists of a tracing template follower, an operator's station, a cabinet-mounted control unit, and variable speed, direct current feed motors.

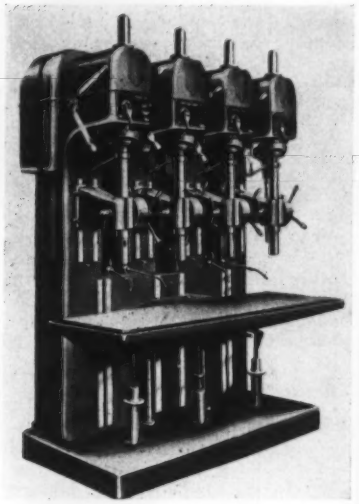
The tracing head is mounted to the tool carriage so that it follows the contours of a template. The control feed motors are mounted on the machine and coupled, usually through a gear reducer, to tool feed screws.

For more information, *write* Product Publicity Dept., Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio.

Variable Speed Drill Has Torque Controlled Feed

AN ALL-GEARED feed with torque control has been added to the redesigned line of R-P-Mster variable speed drills.

Set for maximum torque at the factory, the device will slip when the machine is overloaded, preventing accidental damage. Torque



control assures longer tool and machine life, increases production, and minimizes downtime.

A hard spot in the material being drilled will not break a drill or the machine gearing; the feed will stop until the pressure has been relieved.

Offered in one to six spindle models, the drills are available with special accessories. For more information, *write* Buffalo Forge Co., 158 Mortimer St., Buffalo, N. Y.

Industrial Counter Has Long Life Plug-in Unit

RELIABLE industrial counting at speeds over 1500 a minute can be done with the Robot-Eye RE-8 photoelectronic counter. The unit counts by interrupted or reflected light beam.

The counter has a 6-digit plug-in counter which has a life of over 100 million counts. A replacement counter element simply plugs in, extending instrument life indefinitely.

The counter consists of three units: An amplifier-counter, a photocell, and a light source. The photocell and light source are swivel-mounted for easy installation and alignment. The Robot-Eye will count accurately when the photocell and light source are as far as 10 ft apart. Price is $110.

For more information, *write* Standard Instrument Corp., 657 Broadway, New York, N. Y.

52100 · PETERSON · 52100
PETERSON · 52100 · PETER
00 · PETERSON · 52100 · PE
ERSON · 52100 · PETERSON
52100 · PETERSON · 52100
PETERSON · 52100 · PETER
00 · PETERSON · 52100 · PE
ERSON · 52100 · PETERSON
52100 · PETERSON · 52100
PETERSON · 52100 · PETER
00 · PETERSON · 52100 · PE
ERSON · 52100 · PETERSON
52100 · PETERSON · 52100
PETERSON · 52100 · PETER
00 · PETERSON · 52100 · PE
ERSON · 52100 · PETERSON
52100 · PETERSON · 52100
PETERSON · 52100 · PETER
00 · PETERSON · 52100 · PE
ERSON · 52100 · PETERSON

Looking for the world's most complete stock of 52100 steel tubes and bars? You've come to the right spot . . . . . .

PETERSON STEELS, INC.
Union, New Jersey
Detroit, Michigan Chicago, Illinois

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

WARD STEEL CO.

We specialize in
FINISHED STEEL
BARS—TUBES—STRIP

PROMPT WAREHOUSE SERVICE ONLY

Most Complete Stock in America of
BLUE TEMPERED SPRING STEEL

We believe that the way to sell is to carry a stock which permits satisfying any reasonable warehouse demand.

87A Rindge Ave. Ext. Phone UN 4-2460
CAMBRIDGE 40, MASS.

Branch:
3042-3058 W. 51st Street, CHICAGO, ILL.
Phone Grovehill 6-2600

NEW literature

Write directly to the company for a copy

Tubing Selector Chart

Data chart Sec. B, No. 3 explains the method for calculating the tube size required to machine to a finished dimension. It gives typical examples to follow and differentiates between OD and ID chucking. Peter A. Frasse & Co. Inc., 17 Grant St., New York 13, N. Y.

Design and Foundry Information

A new brochure gives design specifications, mechanical properties, and casting technique for TENS-50 high strength aluminum casting alloys. Navan Products Inc., International Airport, Los Angeles 45, Calif.

Hints on Machine Repair

"How to Make Your Own Machine and Repair Parts Quicker and Easier," 24 pages, covers care and troubleshooting of machines and equipment, machining and welding techniques, and contains drill hole tolerances and a grinding limits chart. W. E. Schneider, La Salle Steel Co., P. O. Box 6800-A, Chicago 80, Ill.

Industrial Cellular Materials

An 8-page pamphlet describes the properties and applications of sponge rubber, neoprene, silicone sponge, Cell-Tite (an expanded closed cell rubber similar in appearance to sponge) and cellular vinyl. B. F. Goodrich Co., 413 Derby Place, Shelton, Conn.

Definitions of Brass Mill Terms

"Copper & Copper Alloy Metalexicon," 24 pages, untangles complex terminology applied to brass mill products. Dept. SBR, American Brass Co., Waterbury 20, Conn.

Alloy Data Card

A reference card lists 19 special metals for high temperature applications. It lists each alloy's composition, density, rupture strength at various temperatures, and its short time properties at room temperature and 1200° F. Advertising Dept., Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.

Bar and Tube Machinery

Medart bar and tube machinery is described in an 18-page booklet, No. 2533-JJ58. Foundry & Mill Machinery Div., Blaw-Knox Co., 300 Sixth Ave., Pittsburgh 22, Pa.

Shipping Container Weights

"What Should Steel Shipping Containers Weigh?" explains the method of computing steel shipping container weights. Steel Shipping Container Institute Inc., 600 Fifth Ave., New York 20, N. Y.

Restore Machine Tools

A 4-page brochure outlines ten ways to tell when a machine tool has lost its original accuracy and should be rebuilt, and the benefits that can be expected from rebuilding. Gahr Machine Rebuilding Co., 19199 St. Clair Ave., Cleveland 19, Ohio.

Office Automation

"How Can You Improve Your Company's Competitive Position?" an 8-page booklet, RT 8903, explains how the new electronic Synchro-Tape typewriter opens new sources of management information while making office methods automatic. Remington Rand Div., Sperry Rand Corp., 315 Fourth Ave., New York 10, N. Y.

Casting Handbook

"Meehanite Castings Serve All Industry," a 32-page booklet (No. 35) gives users of castings a cross section of the scope of the applications of castings. Meehanite Metal Corp., 714 North Ave., New Rochelle, N. Y.

Soluble Cutting Fluid

Cimcool Cimperial Concentrate, a water miscible cutting fluid for heavy duty, low clearance, low speed operations that cover 95 per cent of all metal cutting jobs is described in a 12-page booklet. Cincinnati Milling Products Div., Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Molded Fiber Glass

A 32-page brochure lists the properties of molded fiber glass and describes the fabricating and finishing operations that can be performed on the material. Molded Fiber Glass Companies, 4826 Benefit Ave., Ashtabula, Ohio.

Sonic Energy Cleaning

"How To Appraise Sonic Energy Cleaning" gives the latest facts on applications in industry. Sonic Energy, Pioneer Central Div., Bendix Aviation Corp., Hickory Grove Road, Davenport, Iowa.

Magnetic Properties of Minerals

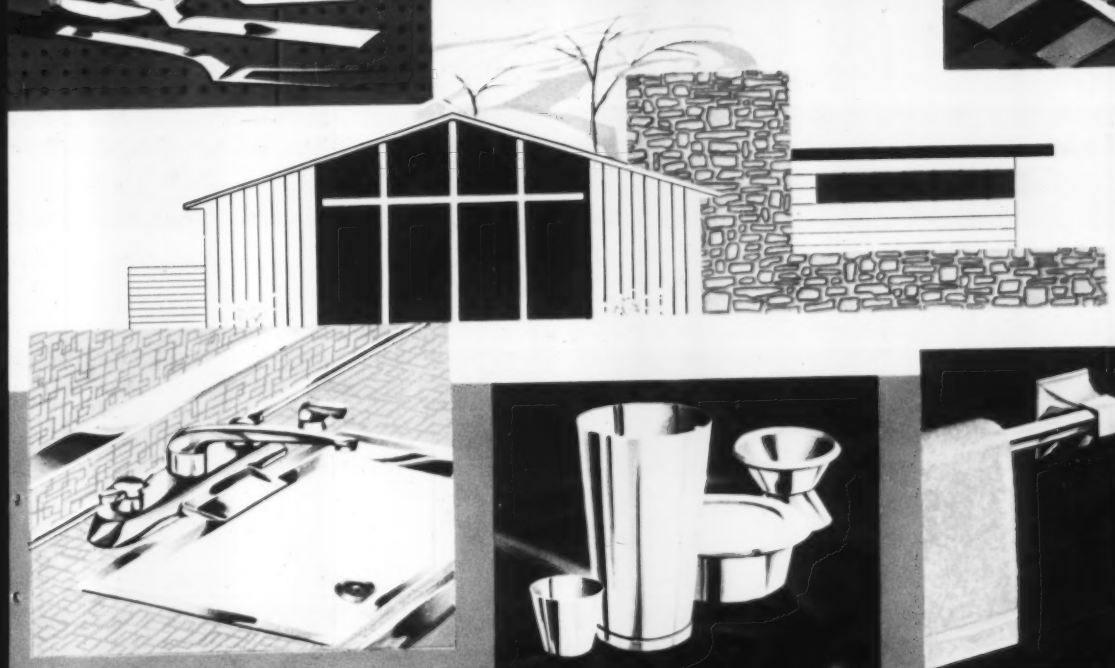
A list of more than 100 minerals with calculated attractibility is included in a bulletin on a high intensity magnetic separator. The magnetic properties are expressed as a percentage of the tractive force exerted by iron in a magnetic field. Bulletin No. 2091. Stearns Magnetic Products, 635 S. 28th St., Milwaukee 46, Wis.

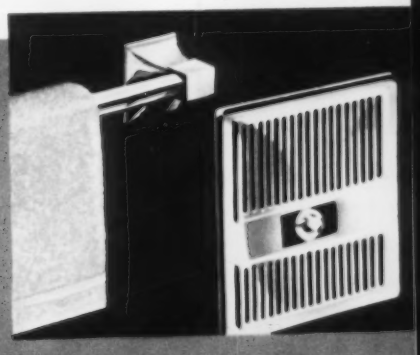
Blueprints of Gearing

"Better Products for Automation through Standardization," a 32-page booklet, contains pictures, drawings, and engineering data for application of precision gears and components. Pic Design Corp., a subsidiary of Benrus Watch Co. Inc., 477 Atlantic Ave., East Rockaway, N. Y.

Fine to have around the house

for every stainless reason!





Superior

STAINLESS STRIP STEEL

At every turn, stainless serves in the modern home . . . brightens the decor, lightens every cleaning chore! From Superior Stainless Strip Steel, precise in specification for each specified need, are made scores of tarnish-proof, wear-resisting, care-banishing home products. ● Let us discuss our steels and your fabrication possibilities, without obligation of any kind.

Superior Steel Division

OF

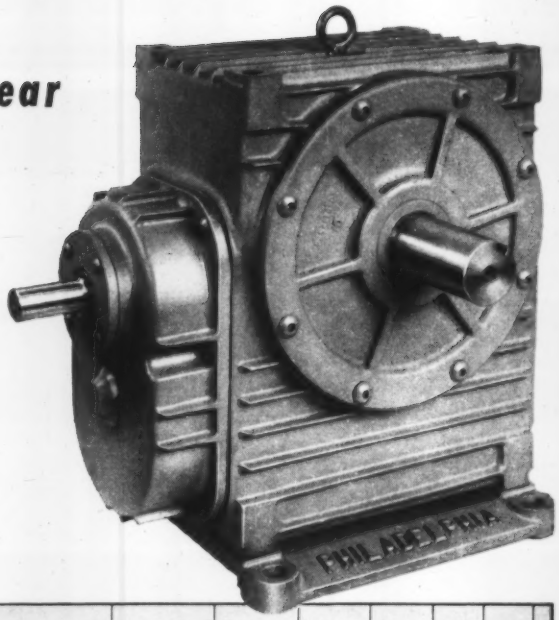
COPPERWELD STEEL COMPANY

CARNEGIE, PENNSYLVANIA

For Export: Copperweld Steel International Company, New York

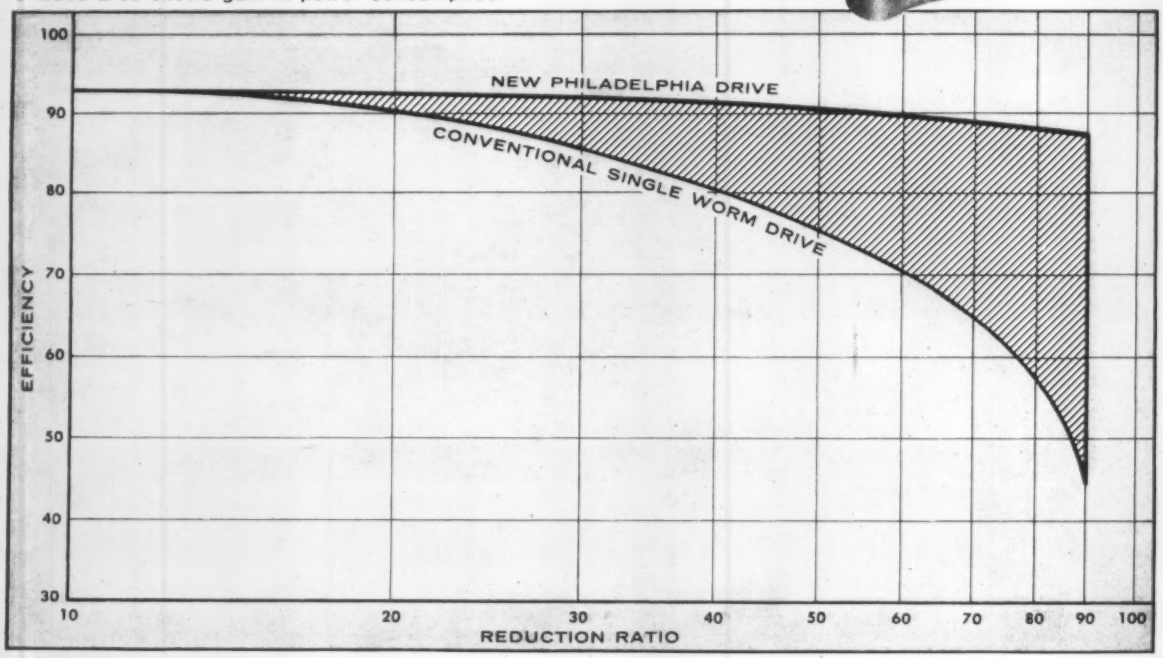
NEW...from Philadelphia Gear

HIGH EFFICIENCY WORM GEAR REDUCERS



Now you can get increased efficiency in worm gear drives —see curve. Helical attachments for double and triple reduction units combine the efficiency advantage of helical gearing with the high ratio advantage of worm gearing. You save on power consumption . . . high operating temperatures will never be a problem.

Shaded area shows gain in power consumption



New flexibility. One basic housing design plus standardized mounting bases, gearing, helical attachments and torque control attachments permit fast assembly from stock. You can get *any* drive arrangement, *any* mounting arrangement, in the exact size and ratio to meet your specific requirements. Torque control attachments for all sizes are available from stock for applications demanding overload protection.

New high capacity. This is not just a re-rated line. Improved tooth forms, precision ground alloy steel worms, special high strength bronze gears, sturdy housings, helical attachments with ground gearing . . . all mean higher capacity in less space. In fact, you get space savings to 50% . . . weight savings to 60%. Ratios from 5⅓: 1 to 1212: 1. Center distances from 3″ to 21″. Write for catalog data today.

philadelphia gear drives

PHILADELPHIA GEAR CORPORATION

Erie Avenue and G Street • Philadelphia 34, Pennsylvania

Offices in all Principal Cities • Virginia Gear & Machine Corp., Lynchburg, Va.

INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID MIXERS • FLEXIBLE COUPLINGS

February 16, 1959

Steel Production Hits 23-Month Peak

STRUGGLING to keep up with their orders, steelmakers pressed marginal facilities into service last week and boosted operations 2.5 points to 83.5 per cent of capacity. Production was about 2,363,000 net tons of steel for ingots and castings, the highest of any week since Mar. 25, 1957.

Steelmaking hit the pinnacle in Buffalo, where producers ran their furnaces at 100 per cent of capacity. Detroit's rate was 95 per cent, while Chicago's climbed to 88.

Last week's production was well above the weekly average of the industry's record year. (In 1955, steelmakers turned out 117 million ingot tons, averaging 2,250,695 tons a week.) Operations are almost certain to reach 90 per cent of capacity during the first half. If they do, we'll reach a new weekly high: 2,548,000 tons (vs. 2,525,000 in the week of Dec. 17, 1956).

CAPACITY OPERATIONS UNLIKELY— Market analysts of the leading steel companies say the industry's ingot rate may hit 93 to 95 per cent of capacity before July. Capacity operations aren't likely because some products (rails, wire, pipe, bars, and structurals), will be in relatively light demand. Full production is forecast for tin plate, sheets (hot rolled, cold rolled, galvanized, and aluminum coated), and plates (if railroad orders pick up).

MILLS LACK FLEXIBILITY— Even though the industry has an enormous ingot capacity (147.6 million tons a year), certain finished products are in tight supply. Steel plants can make steel faster than they can finish it.

SHEETS LEAD MARKET— Demand for sheets is accelerating as users step up consumption and redouble their efforts to accumulate large inventories. Hedge buyers have two incentives: 1. A midyear steel strike might force them to shut down for lack of material. 2. Prices may go up if the settlement is a costly one. Some mills are sold out through the first half on all flat-rolled products. Most are committed through June on cold-rolled and galvanized products and booked into April on hot-rolled material, enameling stock, and electrical sheets. Several of the medium size producers have had to turn down big orders from automotive suppliers.

PLATES & STRUCTURALS GAIN— Plate demand is stiffening. Sheared plates are available within three or four weeks, but two eastern mills are sold out for the quarter and others are closing fast. Much of the improvement is due to inventory buying. There has been no marked pickup in capital goods, although chemical and oil industry needs are expanding and railroad requirements are on the upswing.

Chicago steelmakers note a sudden surge in demand for structurals. More jobs are being awarded, and fabricators feel they must expand their inventories. Eastern mills attribute the gains to public highway work and greater activity in office and apartment construction. Wide flange beams are especially strong. Producers expect full order books for March and have hopes for comparable business in April. Standard structurals are slightly improved, but there's still plenty of idle capacity. Some of the 14 and 28 in. mills are running only six turns a week.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	195	201
Reinforcing	...	202
Boiler Tubes	...	*
Clad Steel	...	205
Coke	217	208
Coal Chemicals	...	208
Charts:		
Finished Steel	...	199
Ingot Rate	198	...
Scrap Prices	...	212
Comparisons	...	199
Contracts Placed	197	...
Contracts Pend.	198	...
Electrodes	...	208
Fasteners	...	204
Ferroalloys	...	*
Fluorspar	...	208
Footnotes	...	204
Imported Steel	...	208
Ingot Rates	198	...
Metal Powder	...	208
Nonferrous Met.	214	216
Ores	...	208
Pig Iron	211	206
Piling	...	201
Plates	195	201
Plating Material	...	217
Prestressed Strand	...	204
Price Indexes	...	199
Producers' Key	202	...
R.R. Materials	...	204
Refractories	194	208
Scrap	211	212
Semifinished	...	201
Service Centers	197	206
Sheets	194	202
Shipments, Steel	198	...
Silicon Steel	...	203
Stainless Steel	...	205
Strip	194	203
Structurals	197	201
Tin Mill Prod.	...	203
Tool Steel	...	205
Tubular Goods	193	205
Wire	191	203

*Current prices were published in the Feb. 2 issue and will appear in subsequent issues.

SIMONDS
ABRASIVE CO.

DOUBLE XX

Reinforced Resinoid depressed center wheels for *Fastest grinding* . . . . .

for all portable disc sanders and right angle type grinders

For grinding all kinds of steel, fabricated parts, castings, etc.—weld grinding, deburring, roughing, finishing.

CALL YOUR SIMONDS DISTRIBUTOR

Proven products
Dependable know-how
Quick supply

With lightweight, rigid-type Double XX wheels you "head" into the work at about a 30° angle . . . literally cutting metal away—a much faster method than grinding it down. Made from fast-cutting aluminum oxide abrasive, strongly bonded with synthetic resins and *doubly* reinforced for extra strength and safety. Use with mounting adaptor. No backing pad required. Available with 7″ and 9″ diameters, 3/16″ and 1/4″ thicknesses. Order from your Simonds distributor.

SIMONDS ABRASIVE COMPANY

Tacony & Fraley Sts., Philadelphia 37, Pa.

DIVISION OF SIMONDS SAW AND STEEL CO.

BRANCHES: CHICAGO • DETROIT • LOS ANGELES • PHILADELPHIA • PORTLAND • ORE. • SAN FRANCISCO • SHREVEPORT

National Standard Co.

More Wire Cloth in '59

It's used in hundreds of applications, most of which are hidden. Sales to industry will hit at least $25 million this year. Total volume will be about 10 per cent ahead of 1958's

WIRE CLOTH manufacturers expect business to be about 10 per cent better this year than in 1958. Last year saw an average drop of about 15 per cent, say sources queried last week by STEEL.

How much dollar volume the industry will do this year is open to question. Estimates run from $25 million to well over $100 million. The Industrial Wire Cloth Institute, New York, predicts that sales of the industrial types will run about $25 million this year. But it points out that it does not represent all makers of industrial wire cloth and none of those of other types.

No industry figures are available because the industry is not clearly defined. A spokesman for the institute points out that "the industry embraces all sizes, types, and kinds of wire cloth which are not insect screening, poultry netting, hardware cloth, wire lath, Fourdrinier, and cylinder facing wires."

• **Basic Facts**—These are the basic weaves: Double crimp or plain; single intermediate, lock, or double intermediate crimp; flat wire; calendered or rolled screen; twilled; oblong or rectangular mesh; stranded, twilled dutch weave, plain dutch weave, and twilled dutch double weave filter cloth.

Nearly every kind of metal wire is used, including steel, stainless, nickel, Monel, aluminum, copper, brass, and bronze. Also offered are such coatings as zinc, tin, lead, rubber, and plastic.

Cambridge Wire Cloth Co., Cambridge, Md., reports that industrial mesh sizes range from "extremely coarse" (openings 4 in. or more in width) to "extremely fine" (up to 500 openings per lineal inch.)

• **Applications**—Wire cloth is used in hundreds of ways, but most of them attract little or no attention. Examples:

Mining and quarrying operations: Oil tempered steel, special types of abrasion-resistant steels, and stainless steels are made into screens for sizing and grading coal, limestone, sand, gravel, and other minerals or raw materials. In further processing of mineral ores, wire cloth is used in screening, straining, or filtering.

Petroleum industry applications: Removing cuttings and other debris from drilling mud; removing foreign matter from pipelines and pumps; separating catalyst from high octane gasoline at refineries.

Metalworking plant uses: Baskets, crates, and fixtures carrying parts through heat treating, quenching, and degreasing operations.

Other uses: Fuel filters for aircraft, missiles, ships, submarines, and automobiles.

• **Competition**—Producers feel harassed by foreign competition, particularly in the fine mesh products. The tariff on this grade is 20 per cent, but it's not high enough to do much good. The industry is trying to get the rate raised because domestic producers are being so badly undersold.

Here's why: Wire cloth is made on looms in much the same way that cloth is woven, so the main cost is labor. In some cases, a piece of domestic wire cloth that sells for $50 a square foot can be sold by foreign producers for as little as $15 a square foot, because of

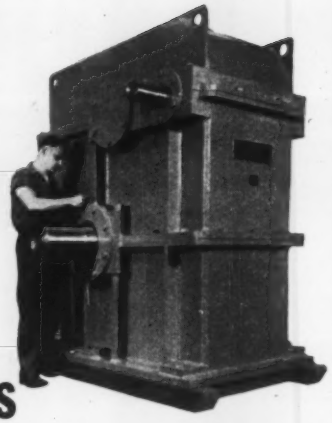
Remember—

H & S

saves you time
and money on

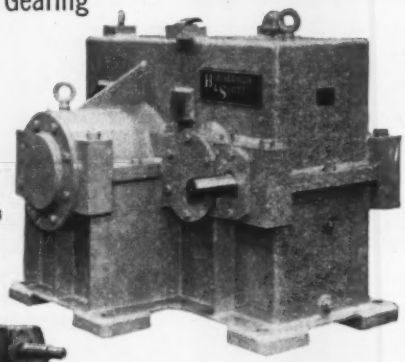
Large Special Drives

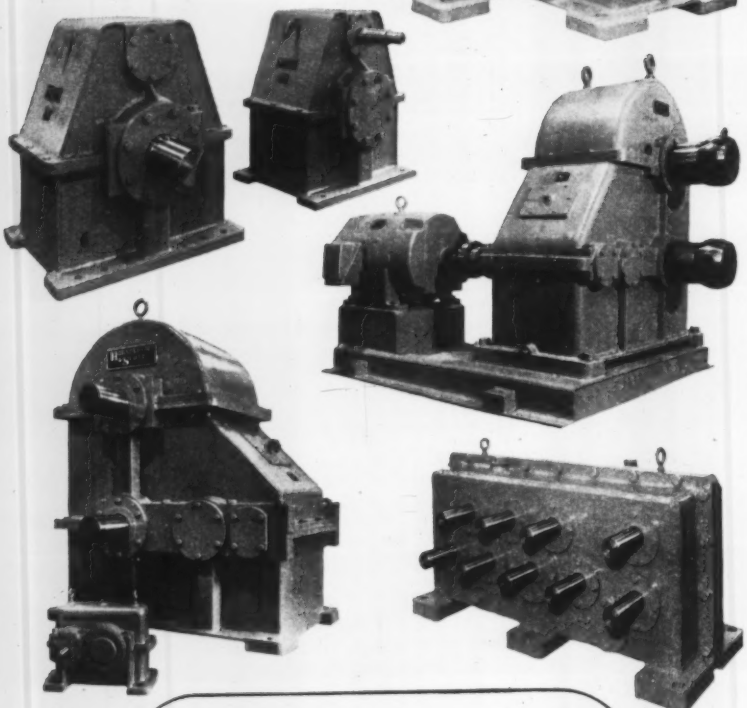
Helical · Herringbone · Worm Gearing



H & S engineers are thoroughly experienced in the design of special drives—can solve unusual drive and transmission problems at the lowest possible cost . . . in the shortest time. Can we help you? Write or call today.

For data helpful in selecting all types of speed reducers and gearing, our Catalogs 55 and 57 are available on request.





THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 Hamilton Avenue • Cleveland 14, Ohio

lower European labor costs. U. S. makers are dropping fine mesh and concentrating on the coarser grades. Others are buying into foreign mills, hoping in this way to compete on common ground.

With that much difference in price, there has naturally been no export market in Europe for such products. There has been some exporting to South America over the years, but the European mills are rapidly driving U. S. makers out of that market, too.

• **Perforated Metal** — For mining and quarrying operations, perforated metal is making inroads into the markets formerly reserved for wire cloth. It's more expensive initially than wire, but it is often more durable. One cause of wire cloth failure in such operations is that when gravel and rocks get between the strands, abrasion sometimes causes early wear. Some makers of wire cloth are extending their lines to perforated metal for the heavier applications.

New Code Number System Simplifies Nail Ordering

Sheffield Div., Armco Steel Corp., Kansas City, Mo., has introduced a new code number system of designating types and sizes of nails. Types are designated by series of numbers, the last digits indicating pennyweight size. A single number, such as 112, replaces the lengthy description "12-penny bright common."

The system is claimed to be a time-saver in record keeping, ordering, inventory control, and warehousing of nail products. Distributors can specify customers' orders to their warehouses by number only.

Here's how the system works: "The four general classifications of nails—common, box, finish, and casing—are numbered in a 100, 200, 300, and 400 series, the last digits indicating the pennyweight size of the nail involved. The balance of the polished nails are in a 1000 assigned numerical series. The 2000 series designates galvanized nails; the 3000 series, cement coated; the 4000 series, blued; the 5000 series, all finishes of ring shank nails;

and the 6000 series, all finishes of screw shank nails.

The 8d bright common nail is to be found in the 100 series under 108. If this nail were to be designated as a galvanized 8d common nail, the 100 series designation would be preceded by a "2" so that its description numerically would be 2108. The system applies similarly to the other sizes and finishes.

Wire . . .

Wire Prices, Pages 203 & 204

While demand for manufacturers' wire is more active, merchant products continue to move sluggishly. It's still too early for a seasonal pickup, and foreign competition is strong, particularly in nails and barbed wire.

More than 1000 tons of baling wire from the Netherlands were unloaded recently at Stockton, Calif. It was a record single shipment for that port, previous shipments ranged 100 to 400 tons.

Users of manufacturers' wire are covering against possible supply shortages and higher prices later this year. Peak demand is expected next quarter, with more consumers of cold-heading wire now reserving space in mill schedules for that period. High carbon spring wire consumers are also ordering ahead. Late March and early April deliveries are still available in most items.

Copperweld Steel Co., Glassport, Pa., has booked a $3,789,499 contract from the U. S. Engineer, Memphis, Tenn., for noncorrosive fabric, side and twist wires. The company will supply 552,000 squares of fabric. The U. S. Engineer is also buying 25,480,000 linear ft of 7-wire steel strands and a large quantity of wire rope.

Tubular Goods . . .

Tubular Goods Prices, Page 205

Pipe distributors are placing heavier orders for March-April delivery, and utilities are reported covering their needs through the second quarter.

Most producers can ship from stocks of buttweld and seamless, but extensions in delivery schedules are said to be imminent. Shipments of some grades of mechanical and pressure tubing are said to run nine

Two-way Sand-handling System

No "dead-heading" at Eastern Malleable

When your sand has to be moved long distances between preparation area and the points of use you can take a tip from The Eastern Malleable Iron Co.'s Wilmington, Del. foundry where these hauls are about 600 feet.

They solved this problem with the use of speedy, high-capacity "PAYLOADER" tractor-shovels and a set-up that practically eliminates all "dead-heading" or travel without payload. So the "PAYLOADER" units are able to scoop up sand from the pouring floor, carry it 600 feet to the shaker, re-load with prepared sand from the nearby pile for the return trip and deliver it to any of the 35 molding stations.

Eastern's newest "PAYLOADER" is this model H-25 — the last word in tractor-shovel design and productivity. It has a carry capacity of 2,500 lbs., it has power-steer, power-shift transmission with two speed ranges both forward and reverse, power-transfer differential and the fullest system of air and oil filters and grease seals for long-life protection and low maintenance.

Your "PAYLOADER" Distributor is ready to give you all the facts on the H-25 or any other "PAYLOADER" models that best fit your needs.

HOUGH

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

The FRANK G. HOUGH Co.
876 Sunnyside Ave.
Libertyville, Ill.

☐ Send me more data on Model H-25
☐ Other "PAYLOADER" units

2-A-2

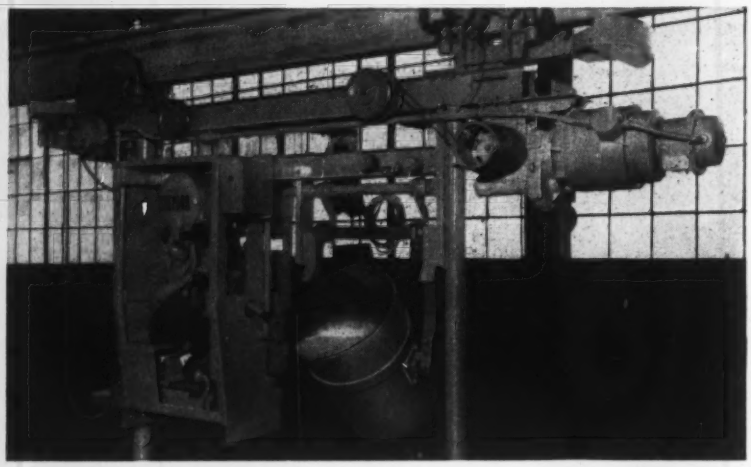
Name_____
Title_____
Company_____
City_____
State_____

SHEPARD NILES

HOT METAL CARRIER

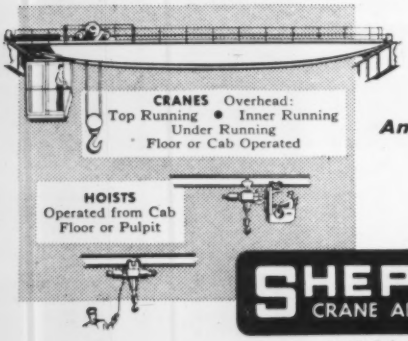
MOVE HOT METAL

the safe, swift, economical way



Shepard Niles hot metal carriers efficiently move molten metal safely and swiftly from cupola to pouring line. These rugged, modern carriers cut handling costs and save manpower by enabling ONE man to transport and pour molten metal. You can be certain of fast precision pouring because the operator cab is on the same level as the hot metal being poured.

Mechanize your foundry for labor-saving, low cost handling of molten metal. Send for the Hot Metal Carrier bulletin . . . or ask that a Shepard Niles representative call — there's NO OBLIGATION.



Building
America's Most Complete Line of Cranes and Hoists
Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION

2382 Schuyler Ave., Montour Falls, N. Y.

to ten weeks. Stainless tubing shipments run to 12 weeks.

Direct mill shipments are reported light in New England, and area distributors are showing more attention to their inventories.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 202 & 203

Most sheet steel sellers are well-committed for the first half of the year on cold-rolled and continuous hot-dipped galvanized sheets. Also, most of them are booked up for first quarter on hot-rolled sheets and certain flat-rolled specialties (enameling stock and electrical sheets).

In practically all of these grades, tonnage is being accepted by the mills on an informal quota basis. That is, customers' previous buying patterns are followed to a great extent in accepting forward orders.

By doing this, mills feel they can assure regular customers their needs will be filled. In some instances, the mills are holding tonnage open on their books for customers of long standing.

The way orders have mushroomed the last month or so, there's a likelihood all users may not be able to lay in all of the inventory they would like to by June 30.

Some consumers are thought to be placing as much tonnage as they can for third quarter as a protective measure. If it turns out they won't need the steel when summer rolls around, they can cancel it. If business is strong, they'll be "sitting pretty" with a place on mill order books.

A substantial chunk of current mill business, particularly hot and cold rolled sheets, is automotive. The carbuilders are doing some hedge buying, and they have been urging their suppliers to protect themselves on steel supplies. The bigger buyers, though, are placing orders on a sober, well-planned basis, whereas, many small users are ordering excitedly.

Some of the orders placed with the various mills may be duplicate tonnage.

Refractories . . .

Refractories Prices, Page 208

Negotiations are underway between Kaiser Aluminum & Chemical Corp., Oakland, Calif., and Mexico Refractories Co., Mexico,

Mo., looking to the possible merger of their respective refractories businesses. Kaiser Chemicals Div. is a major supplier of basic (magnesia) refractories, while Mexico Refractories is a major supplier to industrial users of clay, silica, and alumina refractories, as well as a wide variety of special refractory products.

Steel Bars . . .

Bar Prices, Page 201

There's a little more forward buying in the carbon bar market, but activity does not measure up to that in the flat-rolled products. Bar mill schedules are filling slowly, but hot bar tonnage is still available for March shipment, and deliveries continue fairly prompt in the cold-finished and alloy classifications.

Over-all, the trend of demand is upward, and expectations are that volume will pick up as second quarter approaches and the possibility of a steel strike this summer induces inventory building.

Distributors are not contributing much to new order volume. But it's thought they will by the beginning of next quarter.

Plates . . .

Plate Prices, Page 201

The turnabout in demand for plates continues to accelerate. Producers now expect full order books for the second quarter, though buyers haven't placed all their requirements. Sheared plates are in particularly strong demand, and universal plates are moving a little better.

Most of the improvement in the market is attributed to hedge buying against possible strike-induced shortages at midyear. But pipeline activity is providing a lift to demand, and freight car needs are rising. There's still no sharp pickup in capital goods requirements, but chemical and oil industry needs are expanding, and railroad demands are noticeably up. The Pennsylvania Railroad is setting up a repair program involving 2800 cars.

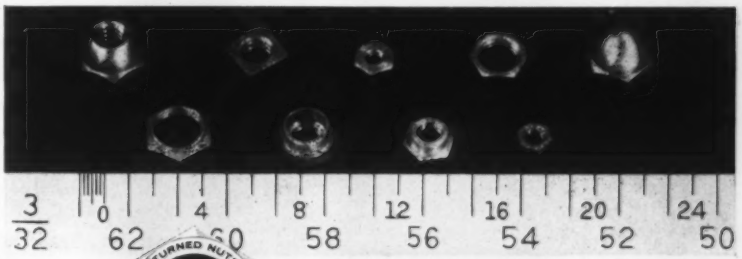
Sheared plates are available in three to four weeks, but two eastern mills are sold out for this quarter, and others are filling their order books rapidly. A Texas mill is reported booked through June. Uni-

IT'S
THE
PROJECT
THAT
DETERMINES
THE
SIZE
OF
THE
FASTENER!

Size is merely relative . . . even in miniature nuts. The real criteria are uniform accuracy, dependable performance and prompt delivery at competitive prices.

As the leading producer of *turned* nuts . . . both standards and specials . . . Fischer can supply a complete range of precision nuts to solve fastening or assembly problems in all types of miniaturized equipment.

Whatever your application, let Fischer quote your next order for miniature or special nuts.



This enlarged scale photograph illustrates typical miniature nuts being supplied for electrical and electronic products.

there's no premium for precision at

Fischer

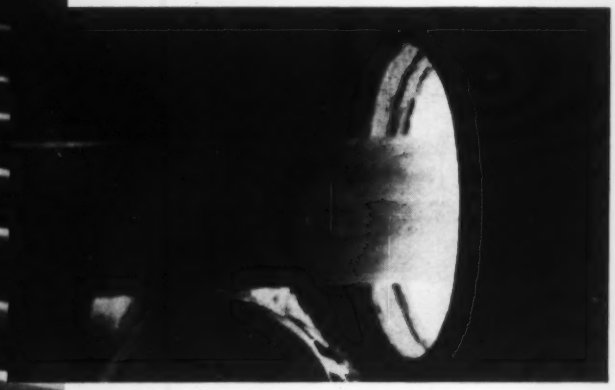
FISCHER SPECIAL MFG. CO.

FISCHER SPECIAL MFG. CO.
476 Morgan St., Cincinnati 6, Ohio
Please send 20-page CATALOG FS-1000 containing complete specifications on brass and aluminum nuts.

Name_____ Title_____
Company_____
Street_____
City_____ Zone____ State_____
6259-FS

"GAS gives us the controllability, cleanliness, economy and speed we demand"

A. O. Smith Corporation



Lengths of oil well casing are in production at the A. O. Smith Corporation in Milwaukee. They are being stress relieved in a gas furnace.

Gas has proved best on A. O. Smith's production line because of its cleanliness, controllability, speed and economy. Gas gives nearly 50% reduction in cost over their previous fuel, and carbon spots have been eliminated. There are three pre-heat furnaces that heat the pipe to 1650°-1750°, depending on the size of pipe. Three re-heat furnaces bring the temperature back up before quenching.

A. O. Smith also produces auto frames, pressure vessels, glass lined farm storage units and tanks, glass-lined gas water heaters and furnaces. Throughout their operations, gas is installed as an integral, indispensable part of their production lines.

For information on how gas can help you in your production operations, call your gas company's industrial specialist. He'll be glad to discuss the economies and superior results you get with modern gas industrial equipment. *American Gas Association.*

versal plates can be had for delivery in two to three weeks.

At Pittsburgh, some platemakers are under pressure to accept huge hedge orders. The mills have ample capacity to meet all normal requirements and moderate inventory building, but they insist they can't ship everyone steel tonnage far beyond requirements. Recently, a Pittsburgh buyer who normally takes 3000 tons of plates a year, asked a mill to ship him 6000 tons within a month.

Distributors . . .

Prices, Page 206

Steel service centers are not experiencing a spurt in business similar to that reported by mills. Demand for hot-rolled carbon bars, structurals, and plates is slow; that for alloys and cold-finished bars, moderately active. Galvanized sheets are on allocation in most districts.

Distributors are not pressing producers with forward hedge buying, but in most instances are protected by usual set-asides against which shipments will be made monthly.

Structural Shapes . . .

Structural Shape Prices, Page 201

More activity is developing in the structural market. Inquiry is increasing, and further gains are anticipated. In the past week, a bulge in demand developed in the Midwest. While it isn't large, indications are the upturn will continue for two reasons: 1. There's more activity in awards. 2. Fabricators feel they must expand their inventories.

The structural mills are getting more second quarter delivery orders. Demand for wide flange sections is noticeably stronger; Pittsburgh makers expect full order books for March, possibly April. But there's still a lot of idle capacity in standard structurals; some mills are running only six turns weekly.

Highway work is promising; there has been an appreciable step-up in office and apartment planning; and industrial construction is showing signs of reviving. Most estimating in New England is for bridges.

Fabricators report some tightening in supplies, particularly wide flange beams, but shipments can still be had within four weeks.

Reflecting the improvement in demand, the Phoenix Steel Corp., Phoenixville, Pa., has reopened its open hearth department. Its backlog has been substantially increased. The plant had been depending on its ingot stockpile.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3510 tons, state bridgework, Saratoga and Warren Counties, N. Y., through D. A. Collins Co., general contractor, to Harris Structural Steel Co., New York.

2400 tons, Chevrolet assembly plant, Baltimore, to Belmont Iron Works, Eddystone, Pa.

2020 tons, factory building for Bowman Biscuit Co., Denver, to Burkhardt Steel Co., Denver.

1340 tons, state highwaywork, Queens County, New York, through Slattery Contracting Co., general contractor, to Lafayette Steel Fabricating Co., Bronx, New York; this contractor also placed 580 tons of 48 and 20 in. water pipe with Yuba Industries, Buffalo.

1200 tons, stadium, Penn State University, State College, Pa., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

1200 tons, state highway bridges, Winchester-Stoneham-Woburn, Mass., to Standard Structural Steel Co., Hartford, Conn.; M. DeMatteo Construction Co., Boston, general contractor.

1150 tons, state roadwork, Hunterdon County, N. J., through I. B. Miller Contracting Corp., general contractor, to Schacht Steel Construction Inc., New York.

800 tons, plant, Philadelphia Gear Works, King of Prussia, Pa., to Frank M. Weaver & Co. Inc., Lansdale, Pa.

150 tons, plant, Wheeling Corrugating Co., Southampton, Pa., to Cantley & Co., Philadelphia.

660 tons, state bridgework, Oneida County, N. Y., through C. D. Parry & Son Inc., general contractor, to Ingalls Iron Works Co., Birmingham.

635 tons, office and distributing building, Avon Products Inc., Rye, N. Y., through W. J. Barney, general contractor, to Belmont Iron Works, Eddystone, Pa.

600 tons, buildings, Avionics Co., comprising 390 tons for a laboratory at Bethpage, N. Y., placed with Harris Structural Steel Co., New York, and 210 tons for a service building at Calverton, N. Y., placed with Lehigh Structural Steel Co., Allentown, Pa.

595 tons, state bridgework, Albany and Schenectady Counties, N. Y., through L. G. DeFelice, general contractor, to Schenectady Steel Construction Co., Schenectady, N. Y.

595 tons, 15-story addition to Berkshire Hotel, Madison Avenue and E. 52nd Street, New York, through Diesel Construction Co., general contractor, to Simon Holland & Son Inc., Brooklyn, N. Y.

495 tons, distribution building, Western Electric Co., Yonkers, N. Y., to Bethlehem Fabricators, Bethlehem, Pa.

445 tons, addition, engineering maintenance building, Johnson & Johnson, North Brunswick, N. J., to Elizabeth Iron Works Inc., Union, N. J.

400 tons, storage warehouse for E. J. Brach & Sons, Chicago, to Vierling Steel Works, Chicago.

330 tons, industrial building, Canton, N. Y., through C. R. Oswald Inc., general contractor, to an unnamed fabricator.

345 tons, state highway bridge, Bangor, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; J. R. Cianchette, Pittsfield, Maine, general contractor.

260 tons, transmission towers, American Electric Power Service Co., Muncie, Ind., to American Bridge Div., U. S. Steel Corp., Pittsburgh.

250 tons, six beam bridges, Bethlehem-Littleton, N.H., to Vermont Structural Steel Co., Burlington, Vt.; W. H. Hinman Inc., West-

SPECIAL
HI-TEMPERATURE METALS

in stock for prompt delivery of your strip requirements. Metals such as 17-7 P.H. Condition A, AM350, A286, Inconel, Inconel "X", 19-9 DX, L605, Hastelloy B, C and X available within four weeks after receipt of order.

CUSTOM
SENDZIMIR MILL ROLLING

of the above metals, and others such as Zirconium and Columbium, on our **Sendzimir Mills** to your specifications. Whatever your special metal or super alloy requirement, call:

SINCE 1924
Ulbrich
"the biggest little mill in the country"

STAINLESS STEELS
WALLINGFORD, CONN.
Phone: COlony 9-7771
TWX Wallingford, Conn. 277

brook, Maine, general contractor.

230 tons, 2-span welded girder bridge, Middletown, Conn., to Standard Structural Steel Co., Hartford, Conn.; Raymond Construction Co., Hartford, general contractor; concrete reinforcing bars to Scherer Steel Co., Hartford.

230 tons, bridgework, New York Power Authority, Niagara Falls, N. Y., through L. G. DeFelice and Gull Contracting Co., general contractors, to Ernst Iron Works Inc., Buffalo.

200 tons, Townsend dam bridge, West River, Vt., through Seven Bros. Inc., general contractor, to City Iron Works, Wethersfield, Conn.

200 tons, Oregon road project, to Poole, McGonigle & Dick, Portland, Oreg.

70 tons, high tensile steel, special design, Hanford Works project, to Pacific Car & Foundry Co., Seattle.

STRUCTURAL STEEL PENDING

2500 tons, Columbia River interstate bridge, near Camas, Wash.; bids soon.

1800 tons, E-R project, Portland, Oreg.; general contract for steel construction to Hoffman Construction Co., Portland, low at $5,297,000.

530 tons, draft tube gates, Tuscarora powerplant, bids Feb. 24 to the Power Authority of the State of New York.

200 tons, shopping center, Renton, Wash.; bids Feb. 12.

PIPE . . .

CAST IRON PIPE PLACED

Unstated, 394,300 ft of wrought iron, standard weight, black and galvanized, General Stores Supply Office, Navy, Philadelphia, to A. M. Byers Co., Pittsburgh, at cost of $161,457.

REINFORCING BARS . . .

REINFORCING BARS PLACED

9300 tons, Puget Sound (Wash.) Navy Yard drydock No. 6, to Bethlehem Pacific Coast Steel Corp., Seattle; Manson Construction & Engineering Co., Seattle, and associates, joint contractors.

430 tons, state highway bridge, Merrimack River, Bedford-Manchester, N. H., to Bethlehem Steel Co., Bethlehem, Pa.; Munroe-Langstroth Inc., Norwood, Mass., general contractor; also 430 tons of steel bearing piles to Bethlehem Steel Co., Bethlehem, Pa.

335 tons, six steel beam bridges, Bethlehem-Littleton, N.H., to Bancroft & Martin Rolling Mills Co., South Portland, Maine; W. H. Hinman Inc., Westbrook, Maine, general contractor.

300 tons, classroom building, University of South Florida, Tampa, Fla., to Florida Steel Corp., Tampa; C. A. Fielland Inc., Tampa, general contractor.

245 tons, state highway bridge, Bangor, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; J. R. Cianchette, Pittsfield, Maine, general contractor.

120 tons, Tacoma (Wash.) office building, to Bethlehem Pacific Coast Steel Corp., Seattle.

PLATES . . .

PLATES PLACED

6000 tons, Puget Sound (Wash.) Navy Yard drydock, piling; about 1500 tons of surplus stock purchased from P.U.D. No. 1, Wenatchee, Wash.; balance of 4500 tons awarded to U. S. Steel Corp. and Bethlehem Pacific Coast Steel Corp., Seattle, by Manson Construction & Engineering Co. and associates, Seattle, general contractors.

800 tons, naval shipyard, Charleston, S. C., to Lukens Steel Co., Coatesville, Pa.

440 tons, medium high tensile hull plates, Puget Sound Navy Yard, Washington State, to Phoenix Steel Corp., Harrisburg, Pa.

320 tons, special treatment, dimpled, mostly Hy-80, Navy Purchasing Office, Washington, D. C., to Lukens Steel Co., Coatesville, Pa., two contracts.

PLATES PENDING

350 tons, 12 ft steel water conduit, Cannonsville Dam, bids Feb. 24, to the New York Board of Water Supply, contract 240.

200 tons or more, 1-million gallon water standpipe; bids in to Rainbow District, Springfield, Oreg., Feb. 9; also involves 3500 ft of 16, 12 and 8 in. pipe.

150 tons, 400,000 gal. elevated water storage tank, Glasgow AFB, Montana; bids Mar. 12, U. S. Engineer, Walla Walla, Wash.

Steel Product Shipments--December, 1958

(Net Tons; All Grades)

Products:	Carbon	Alloy	Stainless	12 Month Totals 1958	1957
Ingots, etc.	11,502	12,220	1,680	267,422	467,456
Blooms, etc.	91,593	35,952	1,506	1,142,116	2,307,901
Tube rounds	1,296	249	5	10,699	55,150
Skelp	6,998	.....	.....	113,546	152,949
Wire rods	82,410	2,037	603	894,936	961,913
Structurals (heavy)	348,654	3,369	16	3,964,608	6,817,796
Steel piling	34,596	.....	.....	439,972	589,673
Plates	461,083	35,528	2,916	5,268,420	9,248,625
Rails (standard)	38,751	.....	.....	539,320	1,194,405
Rails (other)	3,915	.....	.....	39,906	88,563
Joint bars	1,522	.....	.....	33,894	79,942
Tie plates	7,338	.....	.....	108,780	230,941
Track spikes	2,594	.....	.....	40,460	73,752
Wheels	9,814	52	.....	155,711	386,512
Axles	4,741	14	.....	70,795	210,760
Bars (hot rolled)	447,576	128,357	3,204	5,646,563	7,567,400
Bars (reinforcing)	142,914	.....	.....	2,034,795	2,300,127
Bars (cold drawn)	86,628	19,137	4,485	1,023,417	1,319,288
Tool steel	760	6,075	.....	70,270	98,712
Standard pipe	162,623	89	1	2,174,939	2,664,489
Oil country goods	108,308	23,591	.....	1,158,116	2,822,854
Line pipe	144,956	23	.....	2,608,196	4,218,513
Mechanical tubing	45,067	19,372	349	561,243	773,945
Pressure tubing	15,926	5,916	1,238	245,353	395,346
Wire (drawn)	199,361	3,312	2,390	2,362,887	2,598,390
Nails & staples	21,536	.....	.....	417,704	447,301
Barbed wire	2,572	.....	.....	56,031	59,125
Woven fence	5,788	.....	.....	157,070	202,652
Bale ties, etc.	1,865	.....	.....	57,366	48,132
Black plate	33,255	.....	.....	621,096	610,108
Tin plate (HD)	15,841	.....	.....	447,396	649,974
Tin plate (electro)	150,942	.....	.....	5,040,190	4,676,482
Sheets (HR)	664,062	25,786	4,284	6,291,266	7,829,992
Sheets (CR)	1,239,703	4,177	9,484	10,325,661	11,879,354
Sheets (galvanized)	266,472	.....	.....	2,828,848	2,392,637
Sheets (other coated)	25,288	.....	.....	190,063	207,853
Elec. Sheets-strip	3,986	44,560	.....	476,205	618,863
Strip (HR)	114,979	1,821	851	1,048,164	1,392,460
Strip (CR)	82,382	1,405	16,718	981,009	1,274,262
Totals (1958)	5,089,597	373,042	49,730	59,914,433	.....
Totals (1957)	4,732,208	325,239	35,466	.....	79,894,577

Data from the American Iron & Steel Institute, New York.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

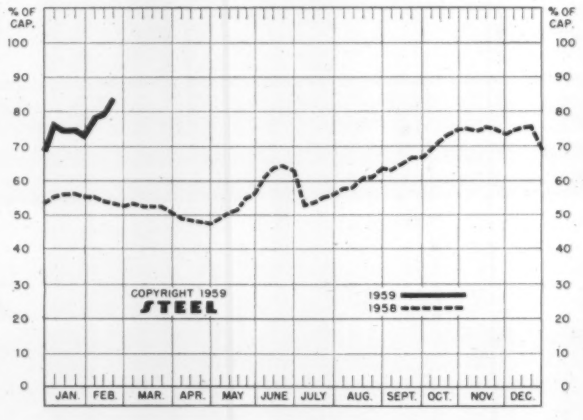
	Week Ended Feb. 15	Change	Same Week 1958	1957
Pittsburgh	84	+ 4*	57	100
Chicago	88	+ 2	57.5	97
Eastern	84	+ 1	76	98.5
Youngstown	75	+ 7	54	100
Wheeling	79	— 2	57	100
Cleveland	85	— 0.5*	36.5	96
Buffalo	100	+14.5	46.5	107.5
Birmingham	73	+ 0.5	51.5	95.5
Cincinnati	90	— 1.5*	44	86
St. Louis	93.5	+ 2*	77	91
Detroit	95	+19*	51.5	101.5
Western	86.5	+ 2.5	66	103
National Rate	83.5	+ 4.5	53.5	97

INGOT PRODUCTION‡

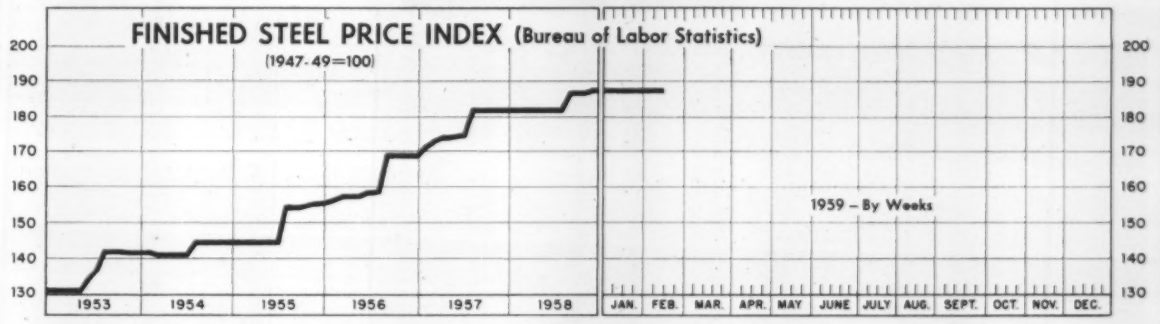
	Week Ended Feb. 15	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	147.1†	142.4	131.4	90.9
NET TONS (In thousands)	2,363†	2,288	2,111	1,445

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Feb. 10, 1959	Week Ago	Month Ago	Jan. Avg	Year Ago
187.0	187.0	187.0	187.0	181.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Feb. 10

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.695
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.903
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.583
		Pipe, Line (100 ft)	199.53
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200	Black Plate, Canmaking Quality (95 lb base box)	7.900
Tubing, Mechanical, Carbon (100 ft)	26.157	Wire, Drawn, Carbon	10.575
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608	Wire, Drawn, Stainless, 430 (lb)	0.665
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100	Bale Ties (bundles)	7.967
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800	Nails, Wire, 8d Common	9.828
		Wire, Barbed(80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Feb. 11 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	239.15	189.74
Index in cents per lb	6.713	6.713	6.713	6.479	5.140

STEEL's ARITHMETICAL COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$145.42	$113.91
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	42.50	42.50	40.33	37.67	27.50

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Feb. 11 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.425	4.15
Bars, H.R., Chicago	5.675	5.675	5.675	5.425	4.15
Bars, H.R., deld. Philadelphia	5.975	5.975	5.975	5.725	5.302
Bars, C.F., Pittsburgh	7.65*	7.65*	7.65*	7.30*	5.20
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.275	4.10
Shapes, Std., Chicago	5.50	5.50	5.50	5.275	4.10
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.545	4.38
Plates, Pittsburgh	5.30	5.30	5.30	5.10	4.10
Plates, Chicago	5.30	5.30	5.30	5.10	4.10
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.10	4.10
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.10	4.10
Plates, Claymont, Del.	5.30	5.30	5.30	5.10	4.10
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	4.925	3.925
Sheets, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Chicago	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Detroit	6.275	6.275	6.275	6.05-6.15	4.975
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.60	5.275
Strip, H.R., Pittsburgh	5.10	5.10	5.10	4.925	4.425
Strip, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.15	5.45
Strip, C.R., Chicago	7.425	7.425	7.425	7.15	5.70
Strip, C.R., Detroit	7.425	7.425	7.425	7.25	5.45-6.05
Wire, Basic, Pittsburgh	8.00	8.00	8.00	7.65	5.525
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.55
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.30	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$96.00	$75.50
Wire rods $\frac{7}{32}$-$\frac{5}{8}$" Pitts.	6.40	6.40	6.40	6.15	4.525

PIG IRON, Gross Ton	Feb. 11 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Phila.	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	56.60
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	60.16
No. 2 Fdry, Birm.	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry(Birm.)deld. Cin.	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	200.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$43.50	$43.50	$42.50	$35.50	$29.50
No. 1 Heavy Melt, E. Pa.	40.00	40.00	36.00	38.50	26.00
No. 1 Heavy Melt, Chicago	44.00	44.00	42.50	39.00	27.00
No. 1 Heavy Melt, Valley	48.50	49.50	43.50	37.50	27.50
No. 1 Heavy Melt, Cleve.	44.50	44.50	39.50	33.50	25.50
No. 1 Heavy Melt, Buffalo	41.50	41.50	35.50	28.50	25.00
Rails, Rerolling, Chicago	64.50	64.50	62.50	56.50	36.50
No. 1 Cast, Chicago	49.50	49.50	46.50	42.50	29.50

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	30.50	30.50	30.50	30.50	25.25

VANCORAM

VANADIUM CORPORATION OF AMERICA

"True, some silicon products are 'cheaper' than others . . ."

. . . But the "cheaper" product may cost you more in the long run! Real economy and efficiency come only when the *right* silicon product is mated with the *right* application. Often, because silicon has so many different uses, it's not so easy to select the product that will give best results – at lowest final cost.

That's where your VCA representative comes in. He can be a real help in determining the ideal form and type of silicon for the job you have to do. And the reason he's so well qualified is that VCA offers a complete line of silicon products – and *knows* its line! Get an impartial recommendation that can mean significant savings in your operations. Call your nearest VCA district office soon! Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y.
Chicago • Cleveland • Detroit • Pittsburgh

Steel Prices

Mill prices as reported to STEEL, Feb. 11, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 202, footnotes, page 204.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B3 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 ..104.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....113.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14 ..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32 ..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 ..126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2 ..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14 ..119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
N.Tonawanda,N.Y. B11 ..6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14 ..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles P3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H. S., L.A. Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ..5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, ALLOY
Aliquippa,Pa. J5 ....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L17 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2..7.50
Youngstown Y1 ....7.50

FLOOR PLATES
Cleveland J5 ....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 ....6.05
Warren,O. c.l. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa,Pa. (9) J5 ..5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa.(9) U5 ..5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ..5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ..5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P22 ....5.675
KansasCity,Mo.(9) S5 ..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 ....6.375
N.T'wan'a,N.Y.(23)B11 6.025
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle B3, N14 ....6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5 ..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15 ..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 ....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Fairless,Pa. U5 ....6.875
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ..5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ..6.125
Niles, Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Loaded
(including loaded extra)
Carbon
LosAngeles P2, S30 11.75*

Alloy
Ambridge,Pa. W18 10.175
BeaverFalls,Pa. M12 10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.050c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B2 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ....8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md. (5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ....9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2 ..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. B5 ....9.025
Lackawanna,N.Y. B2 ..9.025
LosAngeles P2, S30 ....11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 ....9.025
Warren,O. C17 ....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ....9.325
Worcester,Mass. A7 ....9.325
Youngstown F3, Y1 ....9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 .....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2, Y1 5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.425
S.Chicago,Ill. R2, W14 5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ....5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated; to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.60
Seattle B3, N14 .....7.95
SparrowsPt.,Md. B2 ....7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00

McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt) L5 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4) (44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 .....5.575
Tonawanda(4) B12 .....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Lackawanna,N.Y. B2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ...5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1.7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Allenport,Pa. P7 .....6.275
Aliquippa,Pa. J5 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1.6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 .....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1.9.275
Lackawanna(37) B2 ...9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
SparrowsPt. B2	7.225	....
Pittsburgh J5	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 ....6.875†
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 .....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ....6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 .....6.975‡
MartinsFerry,O. W10 .6.875*
Middletown,O. A10 ....6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ...6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ....6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
SparrowsPt.(39) B2 ..10.025
Pittsburgh J5 .....10.125

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Youngstown J5 .....7.50
Weirton,W.Va. W6 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
GraniteCity,Ill. G4 ....6.875
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co., Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Norwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Corp.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2	5.10
Allenport, Pa. P7	5.10
Alton, Ill. L1	5.30
Ashland, Ky. (8) A10	5.10
Atlanta A11	5.10
Bessemer, Ala. T2	5.10
Birmingham C15	5.10
Buffalo (27) R2	5.10
Conshohocken, Pa. A3	5.15
Detroit M1	5.10
Ecorse, Mich. G5	5.10
Fairfield, Ala. T2	5.10
Farrell, Pa. S3	5.10
Fontana, Calif. K1	5.825
Gary, Ind. U5	5.10
Ind. Harbor, Ind. I-2, Y1	5.10
Johnstown, Pa. (25) B2	5.10
Lackaw'na, N.Y. (25) B2	5.10
LosAngeles (25) B3	5.85
LosAngeles C1	8.60
Minnequa, Colo. C10	6.20
Riverdale, Ill. A1	5.10
SanFrancisco S7	6.60
Seattle (25) B3	6.10
Seattle N14	6.60
Sharon, Pa. S3	5.10
S. Chicago W14	5.10
S. SanFrancisco (25) B3	5.85
SparrowsPoint, Md. B2	5.10
Torrance, Calif. C11	5.85
Warren, O. R2	5.10
Weirton, W. Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18	8.40
Farrell, Pa. S3	8.40
Gary, Ind. U5	8.40
Houston S5	8.65
Ind. Harbor, Ind. Y1	8.40
KansasCity, Mo. S5	8.65
LosAngeles B3	9.60
Lowellville, O. S3	8.40
Newport, Ky. A2	8.40
Sharon, Pa. A2, S3	8.40
S. Chicago, Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10	7.575
Bessemer, Ala. T2	7.575
Conshohocken, Pa. A3	7.575
Ecorse, Mich. G5	7.575
Fairfield, Ala. T2	7.575
Farrell, Pa. S3	7.575
Gary, Ind. U5	7.575
Ind. Harbor, Ind. I-2, Y1	7.575
Lackawanna, N.Y. B2	7.575
LosAngeles (25) B3	8.325
Seattle (25) B3	8.575
Sharon, Pa. S3	7.575
S. Chicago, Ill. W14	7.575
S. SanFrancisco (25) B3	8.325
SparrowsPoint, Md. B2	7.575
Warren, O. R2	7.575
Weirton, W. Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10	5.35
Warren, O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn, Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover, O. G6	7.425
Evanston, Ill. M22	7.525
Farrell, Pa. S3	7.425
Follansbee, W. Va. F4	7.425
Fontana, Calif. K1	9.20
FranklinPark, Ill. T6	7.525
Ind. Harbor, Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport, Pa. E10	7.525
NewBedford, Mass. R10	7.875
NewBritain, Conn. S15	7.875
NewCastle, Pa. B4, E5	7.425
NewHaven, Conn. D2	7.875
NewKensington, Pa. A6	7.425
Pawtucket, R.I. R3	7.975
Pawtucket, R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale, Ill. A1	7.525
Rome, N.Y. (32) R6	7.425
Sharon, Pa. S3	7.425
Trenton, N.J. (31) R5	8.875
Wallingford, Conn. W2	7.875
Warren, O. R2, T5	7.425
Worcester, Mass. A7	7.975
Youngstown S41, Y1	7.425

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie, Pa. S18	15.55
Cleveland A7	15.55
Dover, O. G6	15.55
Farrell, Pa. S3	15.55
FranklinPark, Ill. T6	15.55
Harrison, N.J. C18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville, O. S3	15.55
Pawtucket, R.I. N8	15.90
Riverdale, Ill. A1	15.55
Sharon, Pa. S3	15.55
Worcester, Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn, Mich. S3	10.80
Dover, O. G6	10.80
Farrell, Pa. S3	10.80
Ind. Harbor, Ind. Y1	10.80
Sharon, Pa. S3	10.80
Warren, O. R2	10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Briston, Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	8.95	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
FranklinPark, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	...	...	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain, Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle, Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington, Pa A6	8.95	10.40	12.60	15.60	....
New York W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. (32) R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford, Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

STRIP, Cold-Finished Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria, O. S1	19.05	22.15	....
FranklinPark, Ill. T6	19.20	23.30	28.15
Harrison, N.J. C18	18.85	22.95	27.80
New York W3	18.85	22.95	27.80
Palmer, Mass. W12	18.85	....	....
Trenton, N.J. R5	18.85	22.95	27.80
Worcester, Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15
Weirton, W. Va. W6			10.80
Youngstown Y1			10.80

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2	8.175

STRIP, C.R. Electrogalvanized

Cleveland A7	7.425*
Dover, O. G6	7.425*
Evanston, Ill. M22	7.525*
McKeesport, Pa. E10	7.50*
Riverdale, Ill. A1	7.525*
Warren, O. B9, S3, T5	7.425*
Worcester, Mass. A7	7.975
Youngstown S41	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell, Pa. S3	7.50
Sharon, Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Farrell, Pa. S3	5.525
Riverdale, Ill. A1	5.675
Sharon, Pa. S3	5.525
Youngstown U5	5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.20	9.45	9.85
Fairless, Pa. U5	9.20	9.45	9.85
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
GraniteCity Ill. G4	9.20	9.45	9.60
IndianaHarbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa U5	9.10	9.35	9.75
Niles, O R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
SparrowsPoint, Md. B2	9.10	9.35	9.75
Yorkville O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (20-27 Ga.; Dollars per 100 lb)

Aliquippa, Pa. J5	7.90	8.10
Niles O R2	7.90	8.10

TIN PLATE, American 1.25 lb / 1.50 lb

	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.50	10.75
Fairless, Pa. U5	10.50	10.75
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Ind. Harb. Y1	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W. Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa, Pa. J5	$8.20
Fairfield, Ala. T2	8.30
Fairless, Pa. U5	8.30
Fontana, Calif. K1	8.85
Gary, Ind. U5	8.20
GraniteCity, Ill. G4	8.30
Ind. Harbor, Ind. I-2, Y1	8.20
Irvin, Pa. U5	8.20
Niles, O. R2	8.20
Pittsburg, Calif. C11	8.85
SparrowsPoint, Md. B2	8.25
Weirton, W. Va. W6	8.20
Yorkville, O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa, Pa. J5	7.85
Gary, Ind. U5	7.85
GraniteCity, Ill. G4	7.95
Ind. Harbor, Ind. Y1	7.85
Irvin, Pa. U5	7.85
Yorkville, O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary, Ind. U5	$10.05
Irvin, Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W. Va. W10	....	11.70	12.10	13.55	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
GranityCity, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65
					Stator
Vandergrift, Pa. U5					8.10
Mansfield, O. E6					8.10
Warren, O. R2 (Silicon Lowcore)					8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom, W. Va. W10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)

	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	....	19.70	20.20	20.70 ....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annnealed, semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2	8.00
Aliquippa, Pa. J5	8.00
Alton, Ill. L1	8.20
Atlanta A1	8.00
Bartonville, Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville, Ind. M8	8.10
Donora, Pa. A7	8.00
Duluth A7	8.00
Fairfield, Ala. T2	8.00
Fostoria, O. (24) S1	8.10
Houston S5	8.25
Jacksonville, Fla. M8	8.35
Johnstown, Pa. B2	8.00
Joliet, Ill. A7	8.00
KansasCity, Mo. S5	8.25
Kokomo, Ind. C16	8.10
LosAngeles B3	8.95
Minnequa, Colo. C10	8.25
Monessen, Pa. P7, P16	8.00
N. Tonawanda, N.Y. B11	8.00
Palmer, Mass. W12	8.30
Pittsburg, Calif. C11	8.95
Portsmouth, O. P12	8.00
Rankin, Pa. A7	8.00
S. Chicago, Ill. R2	8.00
S. SanFrancisco C10	8.95
SparrowsPoint, Md. B2	8.10
Sterling, Ill. (1) N15	8.00
Sterling, Ill. N15	8.10
Struthers, O. Y1	8.00
Waukegan, Ill. A7	8.00
Worcester, Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria, O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora, Pa. A7	12.65
Duluth A7	12.65
Johnstown, Pa. B2	13.40
Minnequa, Colo. C10	12.775
Monessen, Pa. P7, P16	12.65
Muncie, Ind. I-7	13.60
NewHaven, Conn. A7	12.95
Palmer, Mass. W12	13.70
Pittsburg, Calif. C11	13.45
Portsmouth, O P12	12.65
Roebling, N.J. R5	12.95
SparrowsPt., Md. B2	13.50
Struthers, O. Y1	13.40
Trenton, N.J. A7	12.95
Waukegan, Ill. A7	12.65
Worcester, Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5	9.75
Alton, Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora, Pa. A7	9.75
Duluth A7	9.75
Johnstown, Pa. B2	9.75
KansasCity, Mo. S5	10.00
LosAngeles B3	10.70
Minnequa, Colo. C10	9.95
Monessen, Pa. P7, P16	9.75
NewHaven, Conn. A7	10.05
Palmer, Mass. W2	10.05
Pittsburg, Calif. C11	10.70
Portsmouth, O. P12	9.75
Roebling, N.J. R5	10.05
S. Chicago, Ill. R2	9.75
S. SanFrancisco C10	10.70
SparrowsPt., Md. B2	9.85
Struthers, O. Y1	9.75
Trenton, N.J. A7	10.05
Waukegan, Ill. A7	9.75
Worcester, Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5	9.75
Alton, Ill. L1	9.95
Bartonville, Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora, Pa. A7	9.75
Duluth A7	9.75
Fostoria, O. S1	9.80
Johnstown, Pa. B2	9.75
KansasCity, Mo. S5	10.00
LosAngeles B3	10.70
Milbury, Mass. (12) N6	10.05
Minnequa, Colo. C10	9.95
Monessen, Pa. P7, P16	9.75
Muncie, Ind. I-7	9.95
Palmer, Mass. W12	10.05
Pittsburg, Calif. C11	10.70
Portsmouth, O. P12	9.75
Roebling, N.J. R5	10.05
S. Chicago, Ill. R2	9.75
S. SanFrancisco C10	10.70
SparrowsPt., Md. B2	9.85
Struthers, O. Y1	9.75
Trenton, N.J. A7	10.05
Waukegan, Ill. A7	9.75
Worcester, Mass. A7, J4, T6	10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1	16.50
Bartonville, Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville, Ind. M8	16.40
Fostoria, O. S1	16.30
Houston S5	16.55
Jacksonville, Fla. M8	16.65
Johnstown, Pa. B2	16.30
KansasCity, Mo. S5	16.55
Kokomo, Ind. C16	16.30
Minnequa, Colo. C10	16.55
Monessen, Pa. P16	16.30
Muncie, Ind. I-7	16.50
Palmer, Mass. W12	16.60
S. SanFrancisco C10	17.15
Waukegan, Ill. A7	16.30
Worcester, Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville, Ill. K4	17.15
Monessen, Pa. P16	17.15
Roebling, N.J. R5	17.65

ROPE WIRE (A)

Bartonville, Ill. K4	13.45
Buffalo W12	13.45
Fostoria, O S1	13.45
Johnstown, Pa. B2	13.45
Monessen, Pa. P7	13.45
Muncie, Ind. I-7	13.65
Palmer, Mass. W12	13.75
Portsmouth, O. P12	13.45
Roebling, N.J. R5	13.75
St. Louis L8	13.45
SparrowsPt., Md. B2	13.55
Struthers, O. Y1	13.45
Worcester, Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	11.65
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	11.95
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N. J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7 ... $10.30

NAILS, Cut (100 lb keg)
To Dealers (33)

Wheeling,W.Va. W10 .. $9.80

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$0.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill. (37) N15	9.24

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$0.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.26
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill. (37) N15	9.54

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt., Md. B2	10.75
Sterling,Ill. (37) N15	9.59

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill. (7) N15	214

FENCE POSTS

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213**
SparrowsPoint,Md. B2	198§
Sterling,Ill. (7) N15	198††

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.	9-11½ga.J5 190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.	(43) B2 190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill. (7) N15	192††

WIRE (16 gage)

	An'ld Stone	Galv. Stone
Ala.City,Ala. R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville Ka	17.95	19.75
Cleveland A7	17.85	
Craw'dsville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'lm'r,Mass. W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
Sterling(37) N15	17.25	19.05††
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	9.10	9.775§
Bartonville(48) K4	9.10	9.775
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	
Crawfordsville M8	9.10	9.80‡‡
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown B2(48)	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
Kans.City(48) S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(1)(48)N15	9.00	9.70§§
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc price of: *13.50. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras. §§11.50c.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts
Full Size Body *(cut thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1⅛ in. and larger:	
All lengths	31.0
Undersize Body (rolled thread)	
½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts
Full Size Body (cut thread) & Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts
(Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated. Spec. ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam.	50.0
¾ in. diam.	47.0
⅞ and 1 in. diam.	43.0
1⅛ and 1¼ in. diam.	34.0

NUTS
(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy
Hot Pressed & Cold Punched:

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
¾ in. to ⅞ in. incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0
Longer than 6 in.:	
⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:
6 in. and shorter:

⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0
Longer than 6 in.:	
⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter	+85.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam.:	
6 in. and shorter	+ 5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½ in., larger 12.85
7/8 in. and smaller by 6 in. and shorter: 15.0%.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	.....
KansasCity,Mo. U3	32.15	48.20	61.55	81.10	105.65
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	.....	43.40	55.40	73.00	.....
Pueblo,Colo. W12	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.50
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh P14	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+7.75
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	0.5	+28	+11.5	+37	+22	+45.5	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.25	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on current price of zinc (11.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	28.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	31.50	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	29.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	32.75	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	34.00	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	34.50	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	38.25	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	39.75	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	51.25	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	63.75	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	51.25	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	62.25	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	41.50	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	22.25	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	34.75	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	22.50	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	35.55	42.05

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3, nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. 818.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	W-Cr Hot Work (H-12)	0.530
Spec. Carbon (W-1)	0.385	W Hot Wk. (H-21)	1.425-1.44
Oil Hardening (O-1)	0.505	V-Cr Hot Work (H-13)	0.550
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.455
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago, Ill. R2	66.00	66.50	66.50	67.00
S.Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	68.00	68.50	69.00	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	68.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

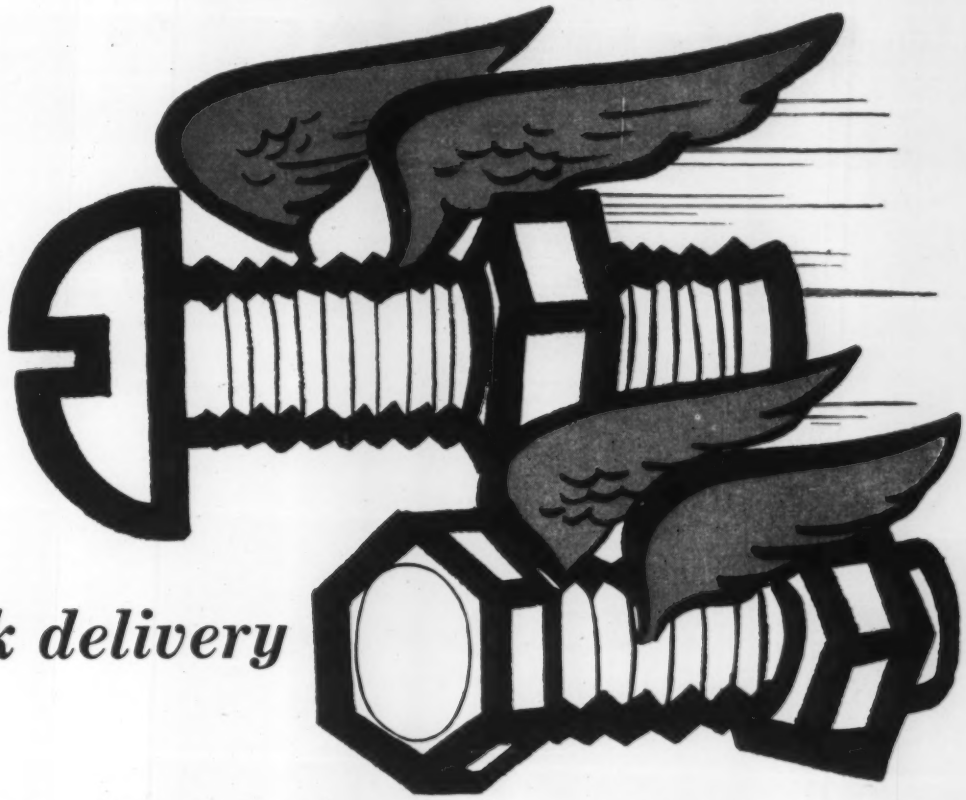
Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	8.59‖	9.86‖	10.13	....	8.91	9.39	13.24 #	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85 #	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.46	....	8.51	8.99	....	....	9.00	8.89	10.90
Boston	9.31	10.40	11.97	53.50	9.73	10.11	13.39 #	15.71	10.01	10.02	11.85
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45 #	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.50	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.53 #	15.37	9.56	9.27	10.53
Cleveland	8.36	9.54	10.65	52.33	8.63	9.10	11.25 #	15.16	9.39	9.13	10.44
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[3]	10.80[3]	12.15[3]	57.60	9.15	9.10[3]	12.95[3]	16.35	9.00[3]	9.10[3]	11.30[3]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25 #	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.10	53.08	9.64	9.99	13.25 #	15.50	9.74	9.77	11.05
Norfolk, Va.	8.40	....	....	....	9.10	9.10	12.00	....	9.40	8.85	10.35
Philadelphia	8.20	9.25	10.61	52.71	9.25	9.40	11.95 #	15.48	9.10	9.15	10.40**
Pittsburgh	8.35	9.55	10.90	52.00	8.61	8.99	11.25 #	15.05	9.00	8.89	10.20
Richmond, Va.	8.40	....	10.40	....	9.10	9.00	....	....	9.40	8.85	10.35
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.49	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.00	16.00	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[3]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.35	11.55	12.55	57.38	10.80	11.05	14.70	16.80	10.25	10.15	13.05
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **½ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [3]—30,000 lb; [5]—1000 to 4999 lb; [8]—1000 to 1999 lb; [10]—2000 lb and over.



quick delivery

when time counts... you can count on Sheffield

You're assured fast delivery of Sheffield bolts, standard or special, when you call in your Sheffield man.

Why? Because Sheffield's completely integrated bolt plant is one of the world's largest. Here engineering know-how and productive capacity are teamed up to handle the toughest bolt problems. And to fill the biggest orders with on-time efficiency.

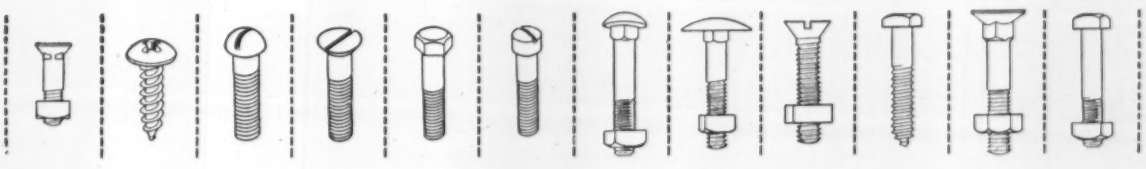
Along with this speed, you're assured top quality. Sheffield's quality control team checks and tests every step of manufacture from furnace to finished bolt. For the right bolts — right when you need them — call in your Sheffield man.

Bolt Makers Since 1888

SHEFFIELD DIVISION

ARMCO STEEL CORPORATION

OTHER DIVISIONS AND SUBSIDIARIES: Armco Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products



Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haideman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Curtner, Calif., $185; Canon City, Colo., $183.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo. $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelan, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $25; barge, Brownsville, Tex., $27.

Ores

Lake Superior Iron Ore

(Prices effective for the 1958 shipping season, gross ton, 51.50% iron natural rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	23.00
N. African hematite (spot)	nom
Brazilian iron ore, 68.5%	22.60

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	*$11.00-$11.25**
Domestic, concentrates f.o.b. milling points	16.00-17.00†

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian (export tax included) $0.95-$1 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$42.00-44.00
48% 2.8:1	38.00-40.00
48% no ratio	29.00-31.00

South African Transvaal

44% no ratio	22.00-23.00
48% no ratio	29.00-31.00

Turkish

48% 3:1	51.00-55.00

Domestic

Rail nearest seller

18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: 98% Fe: F.o.b. Camden or Riverton, N. J., freight allowed east of Mississippi river, ocean bags, 23,000 lb and over	11.25
Sponge Iron, Domestic, 98% Fe: F.o.b. Riverton, N. J., freight allowed east of Mississippi River: 100 mesh, 100 lb bags	11.25
100 mesh, 100 lb pails	9.10‡
40 mesh, 100 lb bags	8.10
Electrolytic Iron, Melting stock, 99.87% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh	
Aluminum: Atomized, 500-lb drum, freight allowed Carlots	38.50
Ton lots	40.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	*33.50-49.60†*
Bronze, 5000-lb lots	*50.50-54.60†*
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 50 mesh	*43.00*
Nickel	*80.60*
Nickel-Silver, 5000-lb lots	*51.60-56.00†*
Phosphor-Copper, 5000-lb lots	*62.80*
Copper (atomized) 5000-lb lots	*43.30-51.80†*
Solder	7.00*
Stainless Steel, 304	$1.07
Stainless Steel, 316	$1.26
Tin	14.00*
Zinc, 5000-lb lots	19.00-32.20‡
Tungsten: Carbon reduced, 98.8% min, minus 65 mesh	Dollars nom.**
1000 lb	2.80
less 1000 lb	2.95
Chromium, electrolytic 99.8% Cr, min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5⅛	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.73
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries.)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.40	$5.40	$5.30	$5.75
Bar Size Angles	5.10	5.10	5.00	5.43
Structural Angles	5.10	5.10	4.90	5.43
I-Beams	5.06	5.06	4.96	5.40
Channels	5.06	5.06	4.96	5.40
Plates (basic bessemer)	6.62	6.62	6.62	6.94
Sheets, H.R.	8.20	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	8.75	8.75	8.75	9.12
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.76	25.64	25.64	26.51
Barbed Wire (†)	6.60	6.60	6.60	6.95
Merchant Bars	5.40	5.40	5.35	5.90
Hot-Rolled Bands	7.15	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	5.19	5.32	5.14	5.49
Wire Rods, O.H. Cold Heading Quality No. 5	5.09	6.22	6.04	6.34
Bright Common Wire Nails (§)	7.89	7.75	7.67	8.26

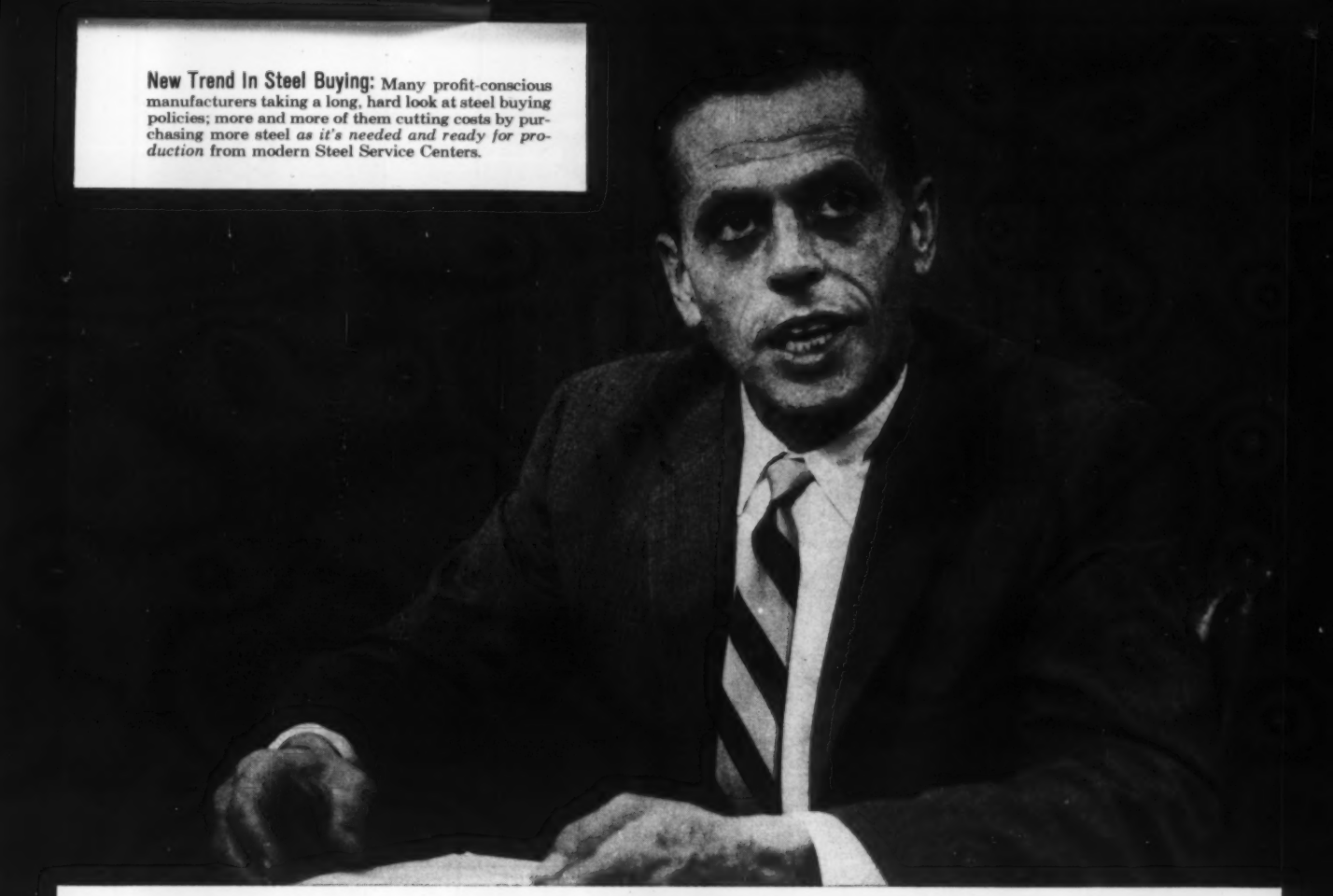
†Per 82 lb net reel. §Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal., f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	22.00
Naphthalene, 78 deg	5.00
Toluene, one deg (del. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, del.	
Phenol, 90 per cent grade	15.50
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$32.00

New Trend In Steel Buying: Many profit-conscious manufacturers taking a long, hard look at steel buying policies; more and more of them cutting costs by purchasing more steel *as it's needed and ready for production* from modern Steel Service Centers.



"We've cut delivery time 75%"

says Mr. W. M. Croft, California Drop Forge Company, Los Angeles, California

"U. S. Steel Supply's prompt deliveries help us keep this drop forge hammer busy."

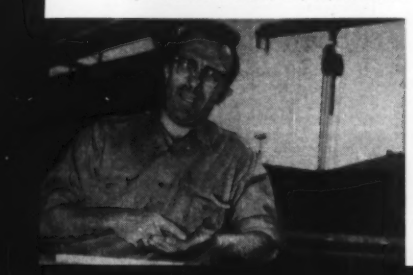
"Our normal delivery time used to be four or five weeks," says Mr. Croft. "Now, we offer 7-day delivery on orders, when necessary, because we're able to get the material we need from U. S. Steel Supply on an overnight basis.

"Recently, we faced this situation: One of our aircraft customers, through an accident, lost 65 parts from a 200-unit order; he notified us immediately, and we, in turn, called U. S. Steel Supply for the material. It arrived the next day, and a week later the re-order was completed. Our customer was impressed!"

Why not take a close look at *your* steel buying policies—you'll find U. S. Steel Supply's booklet entitled "Value Analysis at Work" very helpful. Write to our Chicago Office, or call your nearest U. S. Steel Supply Steel Service Center. You'll find us in the Yellow Pages listed under *steel.*

USS is a registered trademark

"On one day's notice, U. S. Steel Supply furnished us with 80,000 pounds of hot rolled bars," says Mr. J. F. Armitstead, Shop Superintendent.



U.S. Steel Supply Division of USS United States Steel

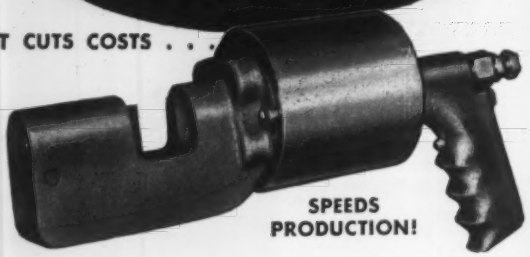
Steel Service Centers and Complete Steel Strapping Service at: Baltimore, Birmingham, Boston, Chicago, Moline, Cleveland, Houston, Dallas, Los Angeles, Milwaukee, Newark, Southington (Conn.), Philadelphia, Seattle, Portland (Ore.), Pittsburgh, St. Louis, St. Paul, San Francisco. General Offices: 208 South La Salle Street, Chicago 4, Ill.

HOW TROUBLE-FREE ARE YOUR ROD and BAR CUTTING OPERATIONS?

Check them with the—

HKP PORTER ONE-HOSE *Hydraulic* ROD and BAR CUTTER

IT CUTS COSTS . . .



SPEEDS PRODUCTION!

If your rod and bar cutting costs are sky-high why not look at the PORTER HYDRAULIC ROD and BAR CUTTER. Steel mill men who size it up usually put it to work — because one or more combination of the 3 Cutterheads and 5 Power Units, turns out to be the team that speeds their output, slashes their costs. Here's why:

CUTTERHEAD PROTECTION — that eliminates constant "TIME OUT" and HIGH MAINTENANCE COSTS!

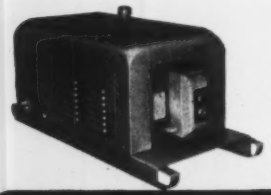
- **LONGER BLADES** with more bearing surface and rigid alignment eliminate side thrust and blade breakage.
- **FILTERED AIR** taken into the cylinder is forced out around the movable blade on each cut — eliminates the danger of dirt reaching bearing surface causing oil leakage and wear.
- **CONCENTRIC DESIGN** eliminates excessive wear of cylinder wall and ram.
- **LARGER CYLINDER AREA** allows the tool to cut capacity stock at a lower operating pressure, resulting in longer life for seal and hose.
- **SAFE, 12 VOLT CONTROL SWITCH** at the cutterhead gives instant finger-tip performance.
- **"KEY-POINT"** wear and replacement reduced to the minimum because of these exclusive HKP features.

A TRUE HYDRAULIC SYSTEM with these efficient, maintenance-saving features:

- **CONTROL VALVE** big and accurate enough for all industrial work. Solenoid operated.
- **EASY TO CHANGE RESERVOIR TYPE 10-MICRON OIL FILTER.**
- **PLUS** many other exclusive HKP features.

Ask to have a Porter Engineer tell you how the 3 CUTTERHEAD sizes and 5 HYDRAULIC POWER UNITS can provide the exact combination for your requirements.

OR — WRITE FOR COMPLETE PORTER HYDRAULIC ROD and BAR CUTTER FOLDER.

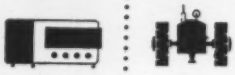


ATTENTION! Production and Quality Control Depts. Ask about our **NEW UPSET TESTING MACHINE!**

H. K. PORTER, INC. Somerville 43, Mass.

Our Business is

MAKING HOLES!



UP TO ½" IN STEEL 60" WIDE

Round holes, slots, square holes, ornamental holes. Need special perforating? Want precision performance — low cost? Accurate provides you the greatest selection of perforations... at a saving in time... material... money! Our expert engineers are prepared to help you with run-of-the-mill demands — or toughest problem jobs. Write for our FREE catalog A-17.

SERVING THESE INDUSTRIES:

AIRCRAFT • AUTOMOTIVE • COMMUNICATIONS • ELECTRICAL EQUIPMENT • FARM MACHINERY • HEATING • RADIO AND RADAR • RAILROADS • SHIP BUILDING • WASHING MACHINES

IN THESE MATERIALS:

ALUMINUM • BRASS • BRONZE • COPPER • LEAD • MONEL METAL • STEEL • MASONITE • STAINLESS STEEL • PLYWOOD • PAPER • CLOTH

ACCURATE
perforating company
3632 SOUTH KEDZIE AVENUE • CHICAGO 32, ILLINOIS

HOT DIP GALVANIZING

JOSEPH P. CATTIE & BROTHERS, INC.

2520 East Hagert Street

Phone: Re-9-8911 **Philadelphia 25, Pa.**

MODERN ELECTROPLATING

563 PAGES ILLUSTRATED

Price $9.50 Postpaid

BY ALLEN G. GRAY

Brings you a complete, up-to-date one-volume summary of current industrial electroplating processes. The only book that emphasizes both practical aspects and basic theory.

The Penton Publishing Company, Book Department, 1213 West Third St., Cleveland 13, Ohio.

DYKEM STEEL BLUE

Stops Losses making Dies and Templates

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

THE DYKEM COMPANY
2303H North 11th St. • St. Louis 6, Mo.

Scrap Stalls After Brief Advance

STEEL's composite on the prime grade holds unchanged at $42.50, following a four week rise. Mill buying continues disappointing despite rising ingot operations

Scrap Prices, Page 212

Chicago—The rising steelmaking rate is exerting strong pressure on the scrap market, but resistance of consumers is holding prices on the steelmaking grades. Buying is limited because the mills hold good inventories and are not in immediate need of melting material. One district consumer, who buys on a steady basis, claims to be getting all the material he needs at his posted buying prices.

The cast iron scrap market is strong, and prices on clean auto scrap and drop-broken machinery are up $1 a ton over a week ago.

Philadelphia—Demand for steel scrap has leveled off. Although a little more activity is reported in export buying, it remains on the light side. Low phos structurals and plates are quoted higher at $44-$45, delivered, couplers, springs, and wheels at $46, and rail crops (2 ft and under) at $59-$60. Malleable is higher at $68.

New York—Demand and supply are in fair balance. Prices are unchanged, except for unstripped motor blocks, for which brokers are offering $1 more at $24-$25. Heavy breakable cast is also up $1 at $33-$34.

Pittsburgh — Railroad lists have closed; bidding on industrial scrap hasn't started. Brokers paid dealers $45 for No. 1 heavy melting and $38 for No. 2 heavy melting recently—the prices include $2.66 freight to a mill on the edge of the district. A substantial tonnage of No. 1 heavy melting moved to Youngstown at $48 delivered, but dealers had to absorb $4.45 freight. Prices are expected to climb gradually until mid-April or early May.

Cleveland—The market's tone is a little less bullish than a week ago, but prices are unchanged with No. 1 heavy melting quoted $44-$45 at Cleveland, and $48-$49 in the Valley. The No. 1 grades are moving fairly well, but demand for the No. 2 grades is absent. The cast iron grades are moving steadily, and some blast furnace material has been moved.

Buffalo—Prices are up an average of $5 a ton, reflecting mill purchases for February delivery. No. 1 heavy melting is quoted $41-$42, No. 2 heavy melting $34-$35, and No. 2 bundles $29-$30.

Demand has picked up with increased operations at two Buffalo area steel mills. Because supplies are relatively limited, the market is noticeably sensitive to a spurt in demand.

Specialty grades have advanced along with the major items.

Detroit — Bad weather in this area has brought preparation and shipments of scrap from dealers' yards to a virtual standstill. So prices are frozen, largely because there's no trading.

Cincinnati—The market is firm, and brokers are having little difficulty filling mill orders placed with them for February delivery. Prices moved up $1 to $2 a ton at the start of this month, and advancing steelmaking operations lend a bullish cast to the scrap market outlook.

St. Louis—The market is firm. Mills are resisting higher prices and dealers are holding on to their supplies.

Birmingham—The tone of the market is stronger, but prices haven't changed much. Some scrap continues to move out of the district by barge, attracted by higher prices offered at northern points.

Houston — Pressure for higher prices is building up. Brokers who increased their buying prices $2 a ton on the major grades when a district mill made an offer at the start of the month are finding the "pickings" slim.

Some scrap is being purchased here and at western Gulf ports for shipment to Japan. Many dealers anticipate a surge in prices as result of a livelier export market. Export quotations are equal to mill buying prices.

Seattle—Little material is moving here, and quoted prices are nominal in the absence of a representative purchase. Dealers anticipate some buying for export soon.

San Francisco — Prices are unchanged, but the market tone is improved. The top steelmaking grades are quoted in a range of $32-$34.

Pig Iron . . .

Pig Iron Prices, Page 206

Movement of pig iron has shown a little improvement since the turn of the new year. Mills are calling for larger tonnages to support increased steelmaking operations. Foundries also are gradually increasing their iron purchases as the demand for castings gains.

Because of the heavy demand for iron at mills, merchant iron consumers are showing a tendency

(*Please turn to Page* 217)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Feb. 11, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Feb. 11	$42.50
Feb. 4	42.50
Jan. Avg.	40.58
Feb. 1958	37.33
Feb. 1954	26.91

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	35.00-36.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	32.00-33.00
No. 1 busheling	43.00-44.00
No. 1 factory bundles	53.00-54.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	22.00-23.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut structurals:	
2 ft and under	51.00-52.00
3 ft lengths	50.00-51.00
Heavy turnings	36.00-37.00
Punchings & plate scrap	52.00-53.00
Electric furnace bundles	52.00-53.00

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Stove plate	41.00-42.00
Unstripped motor blocks	31.00-32.00
Clean auto cast	39.00-40.00
Drop broken machinery	52.00-53.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
Rails, 2 ft and under	*59.00-60.00*
Rails, 18 in. and under	*60.00-61.00*
Random rails	*56.00-57.00*
Railroad specialties	*54.00-55.00*
Angles, splice bars	*54.00-55.00*
Rails, rerolling	61.00-62.00

Stainless Steel Scrap

18-8 bundles & solids	225.00-230.00
18-8 turnings	*120.00-125.00*
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	45.00-46.00
No. 1 hvy melt, dealer	42.00-43.00
No. 2 heavy melting	37.00-38.00
No. 1 factory bundles	48.00-49.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	31.00-32.00
No. 1 busheling, indus.	45.00-46.00
No. 1 busheling, dealer	42.00-43.00
Machine shop turnings	24.00-25.00
Mixed borings, turnings	26.00-27.00
Short shovel turnings	26.00-27.00
Cast iron borings	26.00-27.00
Cut structurals, 3 ft	51.00-52.00
Punchings & plate scrap	52.00-53.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Stove plate	45.00-46.00
Unstripped motor blocks	39.00-40.00
Clean auto cast	*57.00-58.00*
Drop broken machinery	*57.00-58.00*

Railroad Scrap

No. 1 R.R. heavy melt	47.00-48.00
R.R. malleable	59.00-60.00
Rails, 2 ft and under	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Angles, splice bars	55.00-56.00
Axles	72.00-73.00
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles & solids	215.00-220.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	*48.00-49.00*
No. 2 heavy melting	35.00-36.00
No. 1 busheling	*48.00-49.00*
No. 1 bundles	*48.00-49.00*
No. 2 bundles	33.00-34.00
Machine shop turnings	20.00-21.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Low phos.	49.00-50.00
Electric furnace bundles	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	*48.00-49.00*

*Nominal

CLEVELAND

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	30.00-31.00
No. 1 factory bundles	*48.00-49.00*
No. 1 bundles	44.00-45.00
No. 2 bundles	31.00-32.00
No. 1 busheling	44.00-45.00
Machine shop turnings	17.00-18.00
Short shovel turnings	23.00-24.00
Mixed borings, turnings	23.00-24.00
Cast iron borings	23.00-24.00
Cut foundry steel	*44.00-45.00*
Cut structurals, plates 2 ft and under	51.00-52.00
Low phos. punchings & plate	45.00-46.00
Alloy free, short shovel turnings	25.00-26.00
Electric furnace bundles	*45.00-46.00*

Cast Iron Grades

No. 1 cupola	50.00-51.00
Charging box cast	*41.00-42.00**
Heavy breakable cast	41.00-42.00
Stove plate	*47.00-48.00*
Unstripped motor blocks	36.00-37.00
Brake shoes	39.00-40.00
Clean auto cast	50.00-51.00
Burnt cast	40.00-41.00
Drop broken machinery	53.00-54.00

Railroad Scrap

R.R. malleable	66.00-67.00
Rails, 2 ft and under	60.00-61.00
Rails, 18 in. and under	61.00-62.00
Rails, random lengths	55.00-56.00
Cast steel	52.00-53.00
Railroad specialties	53.00-54.00
Uncut tires	46.00-47.00
Angles, splice bars	54.00-55.00
Rails, rerolling	59.00-60.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*215.00-220.00*
18-8 turnings	120.00-125.00
430 clips, bundles, solids	115.00-125.00
430 turnings	45.00-55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	37.00
No. 2 heavy melting	35.00
No. 1 bundles	39.00
No. 2 bundles	28.00
No. 1 busheling	39.00
Machine shop turnings	21.00
Short shovel turnings	23.00

Cast Iron Grades

No. 1 cupola	*50.00*
Charging box cast	40.00
Heavy breakable cast	38.00
Unstripped motor blocks	39.00
Clean auto cast	50.00
Stove plate	45.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.50
Rails, 18 in. and under	52.00
Rails, random lengths	47.50
Rails, rerolling	*61.50*
Angles, splice bars	49.00

BIRMINGHAM

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	33.00-34.00
No. 2 bundles	23.00-24.00
No. 1 busheling	33.00-34.00
Cast iron borings	14.00-15.00
Machine shop turnings	23.00-24.00
Short shovel turnings	24.00-25.00
Bars, crops and plates	43.00-44.00
Structurals & plates	*43.00-44.00*
Electric furnace bundles	39.00-40.00
Electric furnace:	
2 ft and under	37.00-38.00
3 ft and under	36.00-37.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Charging box cast	29.00-30.00
Unstripped motor blocks	40.00-41.00
No. 1 wheels	*42.00-43.00*

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
Rails, 18 in. and under	*51.00-52.00*
Rails, rerolling	*44.00-45.00*
Rails, random lengths	43.00-44.00
Angles, splice bars	44.00-45.00

PHILADELPHIA

No. 1 heavy melting	40.00
No. 2 heavy melting	37.00
No. 1 bundles	41.00
No. 2 bundles	26.00-27.00
No. 1 busheling	41.00
Electric furnace bundles	42.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	24.00-25.00
Machine shop turnings	21.00-22.00
Heavy turnings	36.00-37.00
Structurals & plate	*44.00-45.00*
Couplers, springs, wheels	*46.00*
Rail crops, 2 ft & under	*59.00-60.00*

Cast Iron Grades

No. 1 cupola	39.00-43.00
Heavy breakable cast	43.00
Malleable	*68.00*
Drop broken machinery	49.00-50.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	30.00-31.00
No. 2 bundles	19.00-20.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	15.00-16.00
Low phos. (structurals & plates)	34.00-35.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Unstripped motor blocks	*24.00-25.00*
Heavy breakable	*33.00-34.00*

Stainless Steel

18-8 sheets, clips, solids	190.00-195.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	80.00-85.00

BUFFALO

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	34.00-35.00
No. 1 bundles	41.00-42.00
No. 2 bundles	29.00-30.00
No. 1 busheling	41.00-42.00
Mixed borings, turnings	19.00-20.00
Machine shop turnings	17.00-18.00
Short shovel turnings	21.00-22.00
Cast iron borings	19.00-20.00
Low phos. structurals and plate, 2 ft and under	49.00-50.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	44.00-45.00
No. 1 machinery	48.00-49.00

Railroad Scrap

Rails, random lengths	49.00-50.00
Rails, 3 ft and under	55.00-56.00
Railroad specialties	48.00-49.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	39.50-40.50
No. 2 heavy melting	34.50-35.50
No. 1 bundles	39.50-40.50
No. 2 bundles	26.00-27.00
No. 1 busheling	39.50-40.50
Machine shop turnings	19.00-20.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	22.00-23.00
Cast iron borings	20.00-21.00
Low phos., 18 in.	47.00-48.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Heavy breakable cast	40.00-41.00
Charging box cast	38.00-39.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
Rails, 18 in. and under	57.00-58.00
Rails, random lengths	50.00-51.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	35.00
No. 2 heavy melting	32.00
No. 1 bundles	35.00
No. 2 bundles	22.00
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	42.00

Cast Iron Grades

No. 1 cupola	43.00
Heavy breakable	27.00-28.00†
Foundry malleable	37.00
Unstripped motor blocks	34.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*31.00-31.50*
No. 2 heavy melting	*23.00-23.50*
No. 1 bundles	*31.00-31.50*
No. 1 busheling	*31.00-31.50*
Machine shop turnings	*11.00-11.50*
Short shovel turnings	*13.00-13.50*
No. 1 cast	33.00
Mixed cupola cast	33.00
No. 1 machinery cast	34.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	39.00-40.00
No. 2 bundles	24.50-25.50
No. 1 busheling	38.00-39.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	16.00-17.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	33.00-34.00
Charging box cast	33.00-34.00
Heavy breakable	35.00-36.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	47.00-48.00

SEATTLE

No. 1 heavy melting	31.00
No. 2 heavy melting	29.00
No. 1 bundles	29.00
No. 2 bundles	23.00
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	9.00-10.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	31.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	23.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	33.00
No. 2 bundles	18.00
Machine shop turnings	15.00
Shoveling turnings	18.00
Cast iron borings	15.00
Cut structurals and plate 1 ft and under	47.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00

SAN FRANCISCO

No. 1 heavy melting	32.00-34.00
No. 2 heavy melting	30.00-32.00
No. 1 bundles	30.00-32.00
No. 2 bundles	22.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Cast iron borings	15.00
Heavy turnings	15.00
Short shovel turnings	15.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

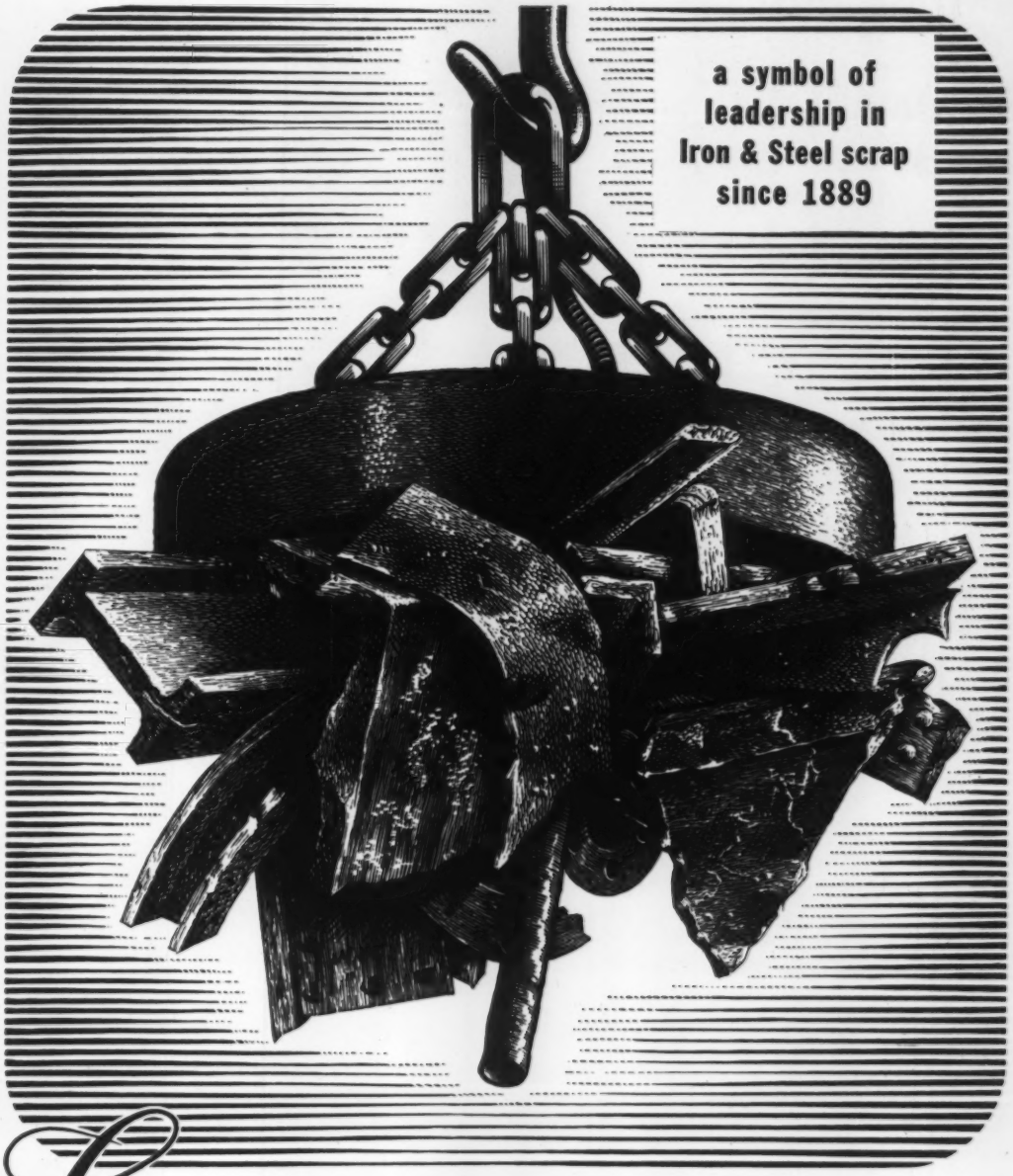
(Brokers' buying prices)

No. 1 heavy melting	34.50
No. 2 heavy melting	30.50
No. 1 bundles	34.50
No. 2 bundles	25.00
Mixed steel scrap	26.50
Mixed borings, turnings	15.00
Busheling, new factory: Prepared	34.50
Unprepared	28.50
Short steel turnings	19.00

Cast Iron Grades‡

No. 1 machinery cast	39.00-41.00

†Nominal.
‡F.o.b. Hamilton, Ont.



Luria Brothers and Company, Inc.

MAIN OFFICE
PHILADELPHIA NATIONAL BANK BLDG.
Philadelphia 7, Penna.

PLANTS
LEBANON, PENNA. DETROIT (ECORSE), MICHIGAN
READING, PENNA.
MODENA, PENNA. PITTSBURGH, PENNA.
ERIE, PENNA.

OFFICES

BIRMINGHAM, ALA.	HOUSTON, TEXAS	PITTSBURGH, PA.
BOSTON, MASS.	KOKOMO, IND.	PUEBLO, COLORADO
BUFFALO, N. Y.	LEBANON, PENNA.	READING, PENNA.
CHICAGO, ILLINOIS	LOS ANGELES, CAL.	ST. LOUIS, MO.
CLEVELAND, OHIO	MEMPHIS, TENN.	SAN FRANCISCO, CAL.
DETROIT, MICH.	NEW YORK, N. Y.	SEATTLE, WASH.

in Canada MONTREAL, QUEBEC — HAMILTON, ONTARIO

EXPORTS-IMPORTS LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

January Zinc Sales Fall

Minor dip stems from inventory adjustment on part of major consumers rather than drop in consumption. Lead price drops. Copper sales going strong

Nonferrous Metal Prices, Pages 216 & 217

ZINC PRODUCERS came into 1959 with high hopes, but January statistics have taken the edge off their optimism.

• **Specifics** — The American Zinc Institute Inc. reports January shipments of slab zinc dropped about 6000 tons to 70,941 tons, the lowest they've been since August. Combined with that was a 1000 ton production increase which sent domestic output to 76,481 tons, the highest figure since January, 1958. Result: Producers' stocks moved up for the first time since July and now stand at 195,777 tons (see chart).

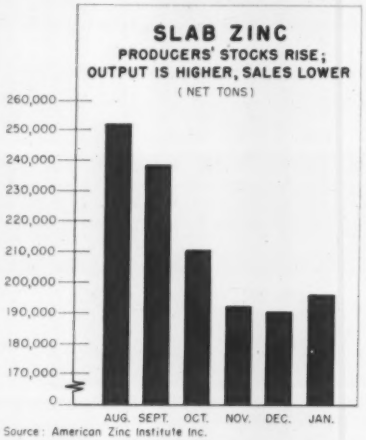
• **No Aspirin Needed** — Actually the figures don't signal much, if any, decreased use of zinc. The industry is suffering a mild hangover that stems from the buying binge of last fall. That's when some major consumers laid in excess supplies in anticipation of higher prices. Some large galvanizers told STEEL that even though they were operating at capacity in January they bought little metal because they have inventory to work off.

Zinc's other major market, the diecasting industry, has also had a minor upset. Shipments to nonautomotive users have held up well, but there has been some dip in demand for automotive diecastings. Reasons: 1. Strikes among auto suppliers have shut down some production lines. 2. Diecasters probably bought a little more metal than needed in anticipation of slightly higher auto output.

Severe weather conditions in the Midwest during January also took their toll on business.

• **Better Days Ahead** — February sales probably won't exceed January's. While some producers report a stepup in new orders, others say business is coming in slower than it did last month. Also, it's a shorter month.

Expect demand to pick up later this month and during March as some galvanizers and diecasters come back into the market for metal. There won't be any boom, however, since more than adequate supplies and stable prices rule out pressures for building inventories.



Source: American Zinc Institute Inc.

Lead Down to 11.5 Cents

The lead price tumbled 0.5 cent to 11.5 cents a pound on Feb. 11. Here's why: Producers haven't had anything approaching heavy demand since a couple of good buying months early last fall. The overseas price has been running better than 3 cents a pound under the domestic quotation. Traditionally, such a wide spread generally signals a price decrease.

Producers report January sales "a little lighter than a poor December." Early indications are that no improvement can be counted on this month.

Historically, lead goes through a slack period at this time of year. But other factors seem to be working against the metal. Quotas on foreign ore and metal, imposed to take some of the surplus off the market, have had little effect. Evidently, there's still a lot of foreign metal available that was brought in before quotas were initiated. Imports of lead fabricated products are on the increase, report some domestic producers.

Other government sponsored programs hold little hope of giving lead any early lift. The barter program has been rendered virtually ineffective by Department of Agriculture requirements. International talks on ways to stabilize the lead-zinc market have been postponed to some time in the spring.

Unless the market picks up soon, another price drop is possible.

Copper Prices Firm

Both primary and custom smelter copper prices should hold at the present level of 30 cents a pound for the next few weeks.

Demand continues strong. Producers say December sales were topped in January; the February rate is even higher.

NONFERROUS PRICE RECORD

	Price Feb. 11	Last Change	Previous Price	Jan. Avg	Dec., 1958 Avg	Feb., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	26.000
Copper	30.00	Feb. 3, 1959	29.00–30.00	29.212	28.856	24.298
Lead	11.30	Feb. 11, 1959	11.80	12.415	12.800	12.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64 50	74.000	74 000	74.000
Tin	102.125	Feb. 11, 1959	102.25	99.409	99.019	93.818
Zinc	11.50	Nov. 7, 1958	11.00	11.500	11.500	10.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western. E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.

Tension . . . by the ton!

While the air-powered Signode stretcher holds the strapping at its one-ton tension, the workman crimps the seal with a Signode air-powered sealer. The seal, the strap—and the tension—will hold, to keep this 4900-pound bundle of steel bars tight and secure to destination. What material other than steel strapping could do this job, could take and hold this tension, would cost so little, could be applied with air power to do the hard work fast? This hefty bundle is a good example of how—and why—Signode can make your product cost less to handle, store, ship and receive. To be specific, call your Signode man, or write:

SIGNODE STEEL STRAPPING CO.

2645 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide.
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.45 per lb deld.
Cobalt: 97.99%, $2.00 per lb for 500-lb keg; $1.75 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb, nom.
Copper: Electrolytic, 30.00 deld.; custom smelters, 30.00; lake, 30.00 deld.; fire refined, 29.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-80 nom. per troy oz.

Lead: Common, 11.30; chemical, 11.40; corroding, 11.40, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, 9Z91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $218-221 per 76 lb flask.

Molybdenum: Unalloyed, turned extrusion, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., incluing import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. points of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $15-17 per troy oz.

Platinum: $52-55 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 90.375 per troy oz.

Sodium: 17.00 c.l.; 19.00-19.50 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y. spot, 102.125; prompt, 102.00.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.62-1.82; grade A-2 (0.5% Fe max.), $1.70 per lb.

Tungsten: Powder, 89.8%, carbon reduced, 1000-lb lots, $3.15 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime Western, 11.50; brass special, 11.75; intermediate, 12.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.50; special high grade, 12.75 deld. Diecasting alloy ingot No. 3, 14.00; No. 2, 14.25; No. 5, 14.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7 per lb; 100-500 lb, $6.50 per lb; over 500 lb, $6 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.875-25.25; No. 12 foundry alloy (No. 2 grade), 21.75-22.00; 5% silicon alloy, 0.60 Cu max., 24.75-25.00; 13 alloy, 0.60 Cu max., 24.75-25.00; 195 alloy, 25.25-26.00; 108 alloy, 22.25-22.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.50; grade 2, 22.00; grade 3, 21.00; grade 4, 19.00.

Brass Ingot: Red brass, No. 115, 28.00; tin bronze, No. 225, 37.50; No. 245, 32.25; high-leaded tin bronze, No. 305, 32.25; No. 1 yellow, No. 405, 23.00; manganese bronze, No. 421, 24.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.895, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.875, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 35.35; l.c.l., 35.98. Weatherproof, 20,000-lb lots, 36.29; l.c.l., 37.04.

LEAD

(Prices to jobbers, f.o.b. Bufalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.00 per cwt; pipe, full coils, $17.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.90-14.35; sheared mill plate, $5.00-8.50; wire, $5.50-9.50; forging billets, $3.55-4.10; hot-rolled and forged bars, $4.25-5.40.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003 and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	....
0.136-0.096	43.20-48.30	....
0.126-0.103	....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	....
0.077-0.061	....	39.50-40.70
0.068-0.061	44.30-52.20	....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	49.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.80	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths

Screw Machine Stock: 30,000 lb base.

Diam. (in.) across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.350	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam. 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ¾ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, .25-30 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots.)

Copper and Brass: No. 1 heavy copper and wire, 23.75-24.75; No. 2 heavy copper and wire, 21.75-22.25; light copper, 19.50-20.00; No. 1 composition red brass, 18.25-18.75; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 30.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	26.000	26.000	25.250
Yellow Brass	47.40	31.99d	47.94	50.81	19.750	19.000	18.000
Low Brass, 80%	50.13	50.07	50.67	53.44	22.125	21.875	21.375
Red Brass, 85%	51.09	51.03	51.63	54.40	23.000	22.750	22.250
Com. Bronze, 90%	52.60	52.54	53.14	55.66	23.875	23.625	23.125
Manganese Bronze	55.82	49.42	59.92	....	18.375	18.125	17.625
Muntz Metal	50.15	45.46	....	....	18.625	18.375	17.825
Naval Brass	52.08	45.89	58.64	54.49	18.375	18.125	17.625
Silicon Bronze	59.23	58.42	58.77	61.23	25.500	25.250	24.500
Nickel Silver, 10%	62.97	65.29	65.29	....	24.625	24.375	12.312
Phos. Bronze	73.82	74.32	74.32	75.50	27.000	26.750	24.750

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.25-17.75; new brass clippings, 15.75-16.25; light brass, 12.00-13.00; heavy yellow brass, 13.00-13.50; new brass rod ends, 14.00-14.50; auto radiators, unsweated, 14.00-14.50; cocks and faucets, 14.50-15.00; brass pipe, 14.75-15.25.

Lead: Heavy, 7.50-8.00; battery plates, 3.00-3.25; linotype and stereotype, 9.25-9.75; electrotype, 7.75-8.25; mixed babbitt, 9.25-9.75.

Monel: Clippings, 30.50-31.50; old sheets, 27.00-28.00; turnings, 22.00-23.00; rods, 30.00-31.00.

Nickel: Sheets and clips, 52.00-55.00; rolled anodes, 52.00-55.00; turnings, 37.00-40.00; rod ends, 52.00-55.00.

Zinc: Old zinc, 3.50-3.75; new diecast scrap, 3.25-3.50; old diecast scrap, 2.00-2.25.

Aluminum: Old castings and sheets, 9.75-10.25; clean borings and turnings, 6.25-6.75; segregated low copper clips, 13.00-13.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.00-12.50; mixed high copper clips, 11.00-11.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 9.00-9.50; segregated low copper clips, 15.50-16.00; segregated high copper clips, 15.00-15.50; mixed low copper clips, 15.00-15.50; mixed high copper clips, 14.50-15.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 9.00-9.50; segregated low copper clips, 14.00-14.50; segregated high copper clips, 12.50-13.00; mixed low copper clips, 13.00-13.50; mixed high copper clips, 12.00-12.50.

REFINERS' BUYING PRICES
(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 56.00; light scrap, 51.00; turnings and borings, 35.00.

Copper and Brass: No. 1 heavy copper and wire, 26.00; No. 2 heavy copper and wire, 24.25; light copper, 22.00; refinery brass (60% copper) per dry copper content, 24.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 26.00; No. 2 heavy copper and wire, 24.25; light copper, 22.00; No. 1 composition borings, 20.50; No. 1 composition solids, 21.00; heavy yellow brass solids, 15.00; yellow brass turnings, 14.00; radiators, 16.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.45. **Copper:** Flat-rolled, 46.79; oval, 45.00, 5000-10 000 lb; electrodeposited, 38.50, 2000-5000 lb lots; cast, 41.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29.999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 120.50; 200-499 lb, 119 00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 18.00; flat tops, 18.00; flats, 20.75; ovals, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.45 per lb in 100-lb drums. **Chromic Acid (flake):** 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.65; 2000-5900 lb, 13.65; 6000-11,900 lb, 13.40; 12,000-22,900 lb, 13.15; 23,000 lb or more, 11.90.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38 00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39 990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 20.80; 400-800 lb, 19.80; 1000-19,800 lb, 18.80; 20,000 lb or more, 17.80.

Sodium Stannate: Less than 100 lb, 79.50; 100-600 lb, 70.20; 700-1900 lb, 67.40; 2000-9900 lb, 65 60; 10,000 lb or more, 64.20.

Stannous Chloride (Anhydrous): 25 lb, 155.00; 100 lb, 150.10; 400 lb 147.70; 800-19,900 lb, 106.80; 20,000 lb or more, 100.70.

Stannous Sulphate: Less than 50 lb, 140.20; 50 lb, 110.20; 100-1900 lb, 108.20; 2000 lb or more, 106.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 211*)
to anticipate their needs a little more in advance.

Insulation Material Cut

Prices on fibrous potassium titanate, lightweight insulation material, have been reduced by E. I. du Pont de Nemours & Co. Inc., Wilmington, Del. The lump form was cut from $12 to $7.50 a pound, with loose fibers, fill, block, mats, and other forms reduced $4.50 a pound.

Suited for applications where space and weight are critical, fibrous potassium titanate may offer construction advantages for rockets, missiles, aircraft, atomic powered vehicles, and other applications.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 208

New equipment for crushing, conveying, and screening is being installed by Milwaukee Solvay Coke Co. at its Milwaukee plant. All sizes of foundry coke will be double screened.

Floods Hamper Production

Floods resulting from heavy rains threatened to disrupt steel and rail operations in the Youngstown district last week. Water got into pits under one blast furnace at Youngstown Sheet & Tube's Campbell Works, knocking it out 4 hours. Water also covered some rail lines.

CLASSIFIED ADVERTISING

STEEL MILL WORKS MANAGER

Bar Rolling and Fabricating Mill Eastern United States has opening for Works Manager.

Age 40-55

Address Box 732, STEEL
Penton Bldg., Cleveland 13, Ohio

STEEL STORAGE

STEEL STRIKE PENDING?

INVENTORY LOW?

We will receive your mill orders, store in heated, humidity controlled, modern warehouse, and ship to you as your production schedules require. Unlimited crane capacity. Call Sk 1-2000, rates surprisingly low.

INDUSTRIAL STORAGE COMPANY
12000 HARVARD AVE. CLEVELAND 5, OHIO

WANTED NATIONAL SALES OUTLET

Well established U. S. manufacturer desires to associate with a sales organization operating in the continental United States, and, preferably, its territories to handle the sale of a new type paint formulated to prevent the corrosion of steel, aluminum and other metals. Material is being manufactured under an exclusive license agreement with a large European chemical firm. Material has been used extensively for the past 10 years in Europe, Asia and Africa, and has achieved phenomenal results. Interested parties should presently be contacting chemical plants, shipyards, construction companies, highway departments, fabricators, etc. Include all particulars first letter.

Box 725, STEEL
Penton Bldg., Cleveland 13, Ohio

FOR SALE

At reduced Bargain Prices
Overhead Traveling Cranes

2 Shaw 10 ton capacity 75′0″ span

1 Shaw 15 ton capacity with 3½ ton auxiliary hoist 71′9″ span

1 Case 10 ton capacity 52′2″ span
All 230 volt DC—equipped with Clark Magnetic Controls.

Can be demonstrated—
Excellent condition

Phone *Wire* *Write*

HYMAN-MICHAELS COMPANY
108 N. State St. Chicago 2, Ill.
Phone: DEarborn 2-5422

50 years of results that satisfy just about everybody... except Oakite.

And we never will be satisfied. Our goal has always been to furnish even *better* cleaning at even *lower* cost—AND IT ALWAYS WILL BE!

Sure we're proud of the hundreds of Oakite "firsts" in developing fine cleaning compounds, cost-cutting methods, time-saving mechanical equipment. But we'll never rest on pride. As soon as we find a satisfactory answer to a cleaning problem—our research starts searching for an even better one.

That's why so many users continue to rely on Oakite to reduce their "per unit" cost. They know that year after year, they are getting the best cleaning for the lowest possible cost.

OAKITE
50 1909-1959 SCIENCE
years' leadership in industrial cleaning

Oakite's pioneering in the future will mean what it has meant for the past 50 years: not only better products, but better service . . . better methods . . . better equipment. All deliberately designed with you in mind to give *you* the most for your cleaning dollar.

This handy guide is a distillation of 50 years of Oakite cleaning experience. It can save you valuable time—and cold cash, too—on all your cleaning operations. Send for it. Oakite Products, Inc., 50A Rector Street, New York 6, N. Y.

Advertising Index

Accurate Perforating Co. 210
Acheson Colloids Co. 168
Aeroquip Corporation 129
Aetna Life Insurance Co. 58
Allegheny Ludlum Steel Corporation 175
Allied Research Products, Inc. 177
Allison-Campbell Division, American Chain & Cable 36
Aluminium Limited Sales, Inc. 106, 107
Aluminum Company of America 41
American Chain & Cable, Allison-Campbell Division 36
American Gas Association 196
American-Marietta Co., The Master Builders Co. Division 9
American Metallurgical Products Co. 59
American Steel & Wire Division, United States Steel Corporation 64, 132, 133
Apex Machine & Tool Co., The 12
Armco Steel Corporation 90
Armco Steel Corporation, Sheffield Division.. 207
Associated Spring Corporation 56
Associated Spring of Puerto Rico, Inc. 56

Baker, J. E., Co. 65
Baldwin-Lima-Hamilton Corporation, Standard Steel Works Division 178
Baltimore & Ohio Railroad 165
Barnes, Wallace, Co., Ltd., Subsidiary of Associated Spring Corporation 56
Barnes, Wallace, Division, Associated Spring Corporation 56
Barnes, Wallace, Steel Division, Associated Spring Corporation 56
Basic, Inc. 84
Bethlehem Steel Co. 1, 25, 26, 27, 28
B-G-R Division, Associated Spring Corporation 56
Blaw-Knox Co., Foundry & Mill Machinery Division 73
Bliss, E. W., Co. 43
Borg-Warner Corporation, Ingersoll Kalamazoo Division 16
Bristol Brass Corporation, The 160
Buell Engineering Co., Inc. 23
Buffalo Bolt Co., Division of Buffalo-Eclipse Corporation 176
Bullard Co., The 110

Carlson, G. O., Inc. 70
Carpenter Steel Co., The 162, 163
Carpenter Steel Co., The, Alloy Tube Division 220
Cattie, Joseph P., & Brothers, Inc. 210
Chicago Steel Service Co. 155
Cincinnati Milling Machine Co., The, Cincinnati Milling Products Division 8
Clark Controller Co., The 3
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 74
Colorado Fuel & Iron Corporation, The 49, 82, 83
Columbia-Geneva Steel Division, United States Steel Corporation 33, 61, 62, 63, 64, 132, 133
Columbia-Southern Chemical Corporation 104
Continental-Diamond Fibre Corporation 103
Continental Screw Co. 32
Copperweld Steel Co., Superior Steel Division 187
Cullen-Friestedt Co. 184
Cutler-Hammer, Inc. ..... Back Cover

De Laval Steam Turbine Co. 159
Dunbar Brothers Division, Associated Spring Corporation 56
Dykem Co., The 210

Eastern Stainless Steel Corporation 34, 35
Eaton Manufacturing Co., Reliance Division .. 81
Electric Controller & Mfg. Co., The, A Division of The Square D Co. ..... Inside Front Cover
Esso Standard Oil Co. 121
Ex-Cell-O Corporation 6
Ex-Cell-O Corporation, Machinery Division 7

Fafnir Bearing Co., The 146
Fairbanks, Morse & Co. 131
Federal Machine & Welder Co., The 29

Finkl, A., & Sons Co. 72
Fischer Special Mfg. Co. 195
Fuller Co. 50

General Electric Co. 37, 38, 39, 40
General Electric Co., Metallurgical Products Department 124
General Motors Corporation, Saginaw Steering Gear Division 68
Gerlinger Carrier Co. 69
Gibson Division, Associated Spring Corporation 56
Green River Steel Corporation 17
Greenlee Bros. & Co. 181
Gulf Oil Corporation 126, 127

Hancock Industries, Inc., Telecontrol Division 46, 47
Hanson-Van Winkle-Munning Co. 24
Harrington & King Perforating Co., Inc., The 184
Hayes, C. I., Inc. 117
Hevi-Duty Electric Co. 134
Hoover Ball & Bearing Co. 173
Horsburgh & Scott Co., The 192
Hough, Frank G., Co., The 193
Hyde Park Foundry & Machine Co. 219

Industrial Storage Co. 217
Ingersoll Kalamazoo Division, Borg-Warner Corporation 16
Inland Steel Co. 89

Jeffrey Manufacturing Co., The 42
Jones & Laughlin Steel Corporation, Stainless & Strip Division 130

Landis Machine Co. 14, 15
La Salle Steel Co. 57
Leeds & Northrup Co. 52
Lindberg Engineering Co. 20, 21
Link-Belt Co. 44
Luria Brothers & Co., Inc. 213

Magnethermic Corporation 114
Manross, F. N., & Sons Division, Associated Spring Corporation 56
Marchant, Geo. F., Co. 176
Master Builders Co., The, Division of American-Marietta Co. 9
Metallurgical Products Department of General Electric Co. 124
Micromatic Hone Corporation 182, 183
Milwaukee Division, Associated Spring Corporation 56

National Acme Co., The 54, 55
National-Standard Co. 53
National Steel Corporation 13
National Tube Division, United States Steel Corporation 64
Nilson, A. H., Machine Co., The 136
Noble Co. 22
Norton Co., Machine Division 18, 19

Oakite Products, Inc. 218
Ohio Division, Associated Spring Corporation 56
Osborn Manufacturing Co., The 128

Pangborn Corporation ..... Inside Back Cover
Partlow Corporation, The 48
Peterson Steels, Inc. 185
Philadelphia Gear Corporation 188
Pittsburgh Engineering & Machine Division of Pittsburgh Steel Foundry Corporation 157
Porter, H. K., Inc. 210

Raymond Manufacturing Division, Associated Spring Corporation 56
Reliance Division, Eaton Manufacturing Co... 81
Remington Rand Division, Sperry Rand Corporation 135
Republic Steel Corporation 30, 31
Revere Copper & Brass, Inc. 11
Rockford Machine Tool Co. 76, 77
Roebling's, John A., Sons Corporation, A Subsidiary of The Colorado Fuel & Iron Corporation 49
Royal McBee Corporation, Data Processing Division 145
Ryerson, Joseph T., & Son, Inc. 92

Saginaw Steering Gear Division, General Motors Corporation 68
Sciaky Bros., Inc. 60
Seaboard Pacific Division, Associated Spring Corporation 56
Sheffield Division, Armco Steel Corporation .. 207
Shenango Furnace Co., The, Centrifugally Cast Products Division 180
Shepard Niles Crane & Hoist Corporation .. 194
Signode Steel Strapping Co. 215
Simonds Abrasive Co., Division of Simonds Saw & Steel Co. 190
Simonds Saw & Steel Co. 75
SKF Industries, Inc. 2
Sperry Rand Corporation, Remington Rand Division 135
Square D Co., The, The Electric Controller & Mfg. Co. Division ..... Inside Front Cover
Standard Steel Works Division, Baldwin-Lima-Hamilton Corporation 178
Stuart, D. A., Oil Co., Ltd. 79, 80
Sun Shipbuilding & Dry Dock Co. 78
Superior Steel Division of Copperweld Steel Co. 187
Surface Combustion Corporation 66, 67

Taylor, S. G., Chain Co., Inc. 116
Telecontrol Division, Hancock Industries, Inc. 46, 47
Tennessee Coal & Iron Division, United States Steel Corporation 33, 61, 62, 63, 64, 132, 133
Texas Co., The 71
Textile Machine Works, Contract Division 170, 171
Textron, Inc., The Waterbury Farrel Foundry & Machine Co. Division 123
Tinnerman Products, Inc. 118
Torrington Co., The, Specialties Division 10
Towmotor Corporation 69
Townsend Co. 174

Ulbrich Stainless Steels 197
United Engineering & Foundry Co. 51
United States Drill Head Co. 179
United States Steel Corporation, Subsidiaries 33, 61, 62, 63, 64, 132, 133, 209
United States Steel Export Co. 33, 61, 62, 63, 64, 132, 133
United States Steel Supply Division, United States Steel Corporation 61, 64, 209

Vanadium Corporation of America 200
Veeder-Root, Inc. 4
Virginia Gear & Machine Corporation 188

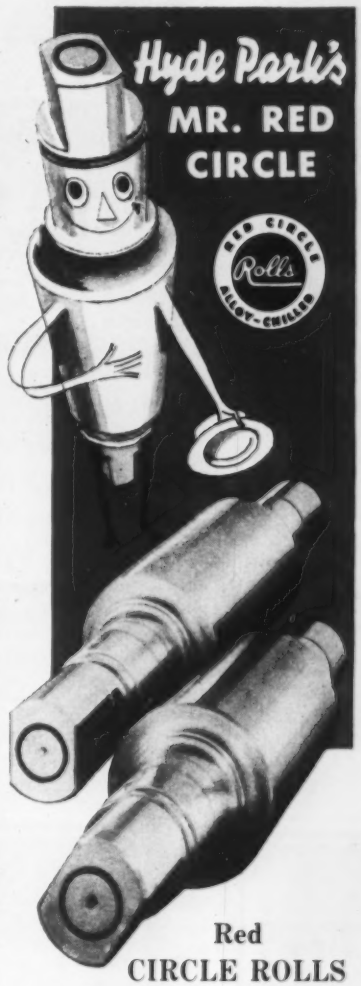
Ward Steel Co. 186
Waterbury Farrel Foundry & Machine Co., The, Division of Textron, Inc. 123
Wean Equipment Corporation 113
Weirton Steel Co. 13
Wheland Co., The 186
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation 82, 83

Youngstown Sheet & Tube Co., The 45

~ ~ ~

Table of Contents, Page 5

Classified Advertising, Page 217



Red
CIRCLE ROLLS
for every purpose

Uniform performance, high production and long service are unfailing characteristics of these better rolls.

Preferred by leading mills throughout the nation for more than half a century.

Yes, there's a Red Circle Roll for every purpose.

ROLLS

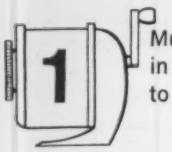
Nickel Alloy Grain Rolls
Grain Rolls
Chilled Rolls
Nickel Chilled Rolls
Moly Rolls
Nodular Iron Rolls

All Grades Nickel Alloy Iron Rolls for Hot and Cold Rolling

Hyde Park
FOUNDRY and MACHINE CO.
HYDE PARK
Westmoreland County, Pa.

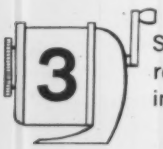
Rolls
Rolling Mill Equipment
Gray Iron Castings

9 WAYS TO SHARPEN YOUR PURCHASING PENCIL BY BUYING CARPENTER STAINLESS TUBING AND PIPE

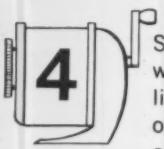


Multiple Lengths. If you order delivery in multiple lengths, you can save up to 3½%.

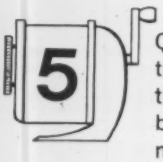
Selected Mill Lengths. Automatic savings from 2% to 5% if so ordered.



Shorts. If you order 90% of your requirement in cut lengths and 10% in short lengths, you can save 5%.

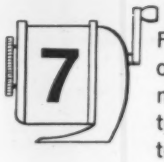


Standard Tolerances. If you order within published standard tolerance limits, you can save up to 12%; in other words, closer than standard tolerances add 6 to 12% to the cost.

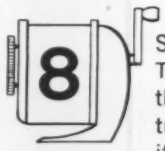


Quarterly Buying. Place your order on the mill for delivery during a specific three month period. This way you will be able to provide material for a three month period and you'll have potential saving through purchasing at a lower cost.

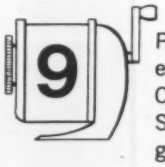
Consider the Next Quantity Bracket. If your requirements for tubing or pipe come close to the upper limits of a quantity bracket, consider future use for this material and jump to the next bracket. Often you will gain several hundred feet of product by jumping to the next bracket at no added per unit cost.



Finish. Recently there have appeared on the market, many conditions of manufacture, ranging from as-welded to full finished. Consider the service to which this tubing or pipe will be applied and consider the few pennies involved for obtaining the best finish compared with the dollars lost by downtime and lost production through use of the cheapest grade available.



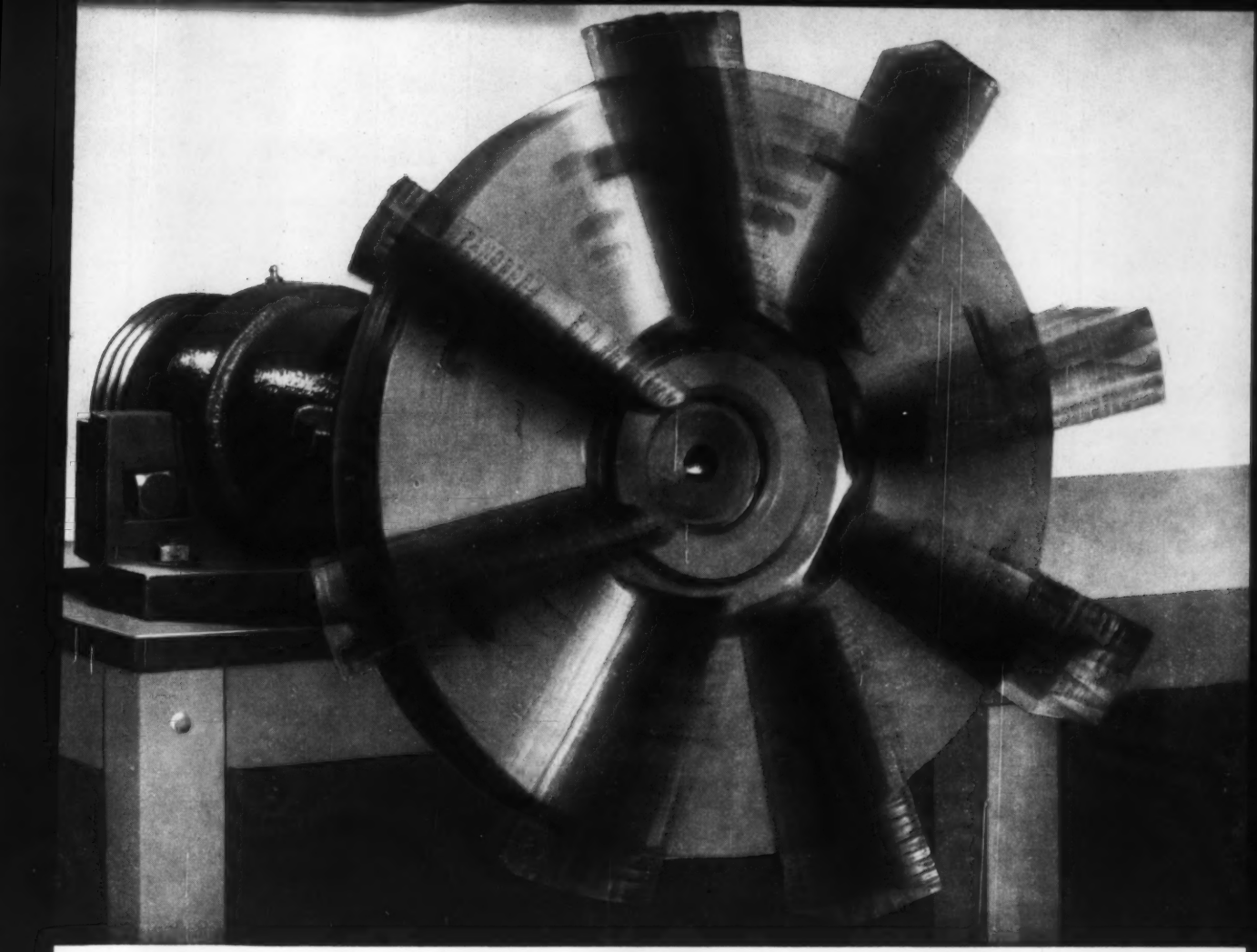
Standard Sizes. Carpenter Stainless Tubing and Pipe are made available through a nationwide network of distributors who stock standard sizes, so if you need something quickly you can get it. Don't design equipment, unless it is unavoidable, around other than standard sizes of tubing and pipe.



Performance. To guarantee the greatest operating economy, order from Carpenter. Carpenter WELD-TROL Stainless Tubing and Pipe give you the greatest degree of uniformity available in tubing today. This key factor is your ticket to longer, cost-saving performance. Contact your nearest authorized distributor or write for technical bulletin. The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

your master key to cost-saving corrosion control

Stainless Tubing & Pipe



"Rotoblasting" a profit pattern

Pangborn Rotoblast Wheel gives you minimum blast cleaning costs.

This cutaway view of power-in-motion spells *efficiency* . . . the efficiency of Pangborn Blast Cleaning Machines.

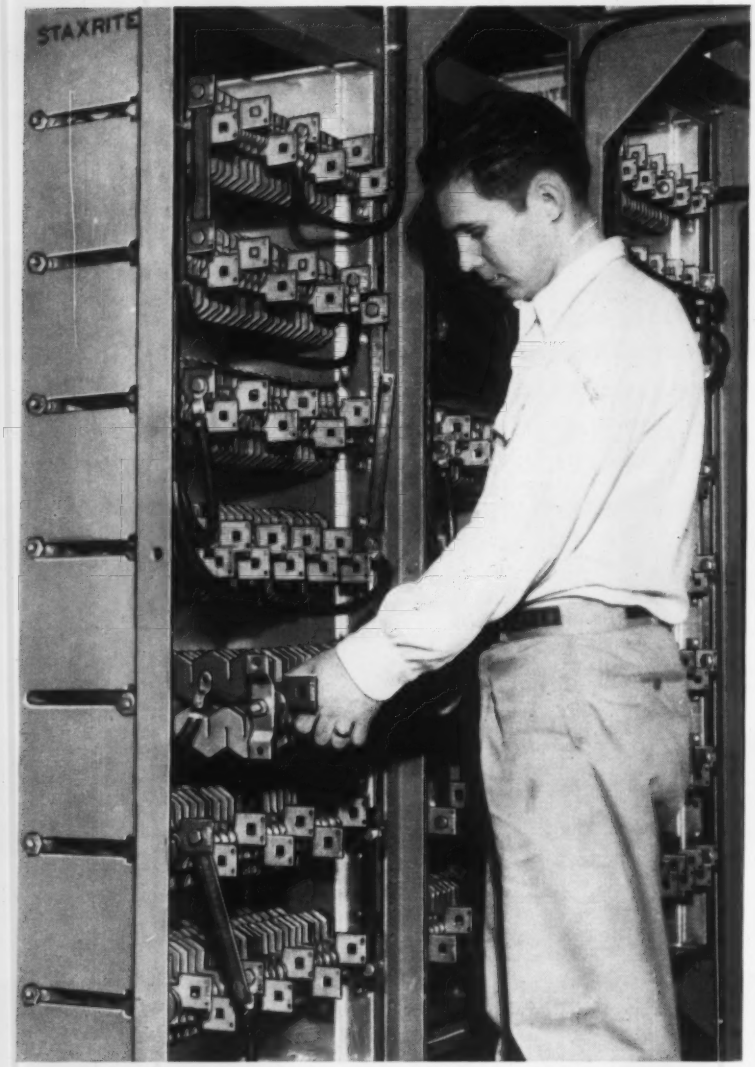
The Pangborn-developed central impellor design makes possible high abrasive discharging capacity at high efficiency. Up to 160,000 lbs. of abrasive an hour can be efficiently handled by these Rotoblast Wheels. Service ease and reliability are assured by Pangborn vane locking design. Permanent factory alignment of running parts and bearings, plus the lubrication system, permit wheel spindle mounting at any angle. It is this kind of engineering—whichever size Rotoblast Wheel *your* Blast Cleaning Machine needs—that lowers cost by giving you maximum production with a minimum of maintenance.

Pangborn Blast Cleaning Barrel—one of a complete line of Pangborn machines utilizing the cost-cutting principle of Rotoblast cleaning.

The Pangborn Engineer in your area will be glad to go to work on your cleaning problem at no obligation. And for complete information on Pangborn Rotoblast Wheels, write to Pangborn Corp., *1600 Pangborn Blvd., Hagerstown, Md., Manufacturers of Blast Cleaning and Dust Control Equipment.*

Pangborn cleans it fast with ROTOBLAST®

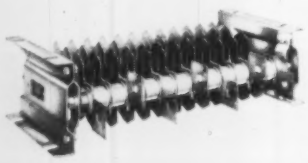
Complete non-breakable resistor banks... factory assembled, wired and ready to go



Here is the very latest word in Mill Duty resistors . . . Cutler-Hammer's "draw-out" designed non-breakable mill duty resistors and Staxrite®, the multiple resistor mounting frame. Together these two units become a solid free-standing resistor bank that can be "custom-tailored" to meet your specific needs. Staxrite resistor frames, available in graduated sizes, will accommodate up to nine non-breakable resistor units. Add to this the optional feature of a terminal board and grid-to-terminal wiring and your resistor bank is ready for rapid installation. No more time-consuming box-to-box mounting. Costly on-the-job wiring is cut to a bare minimum. A Staxrite resistor bank saves valuable space too . . . it only requires the floor area of a single resistor box.

Notice how easily the "draw-out" designed resistor units slide in and out of position; this is a Cutler-Hammer exclusive. Each resistor unit is completely independent, and can be serviced or replaced by a spare unit without disturbing end frames, adjacent resistor units, or mounting members. "Draw-out" design will cut your "down-time" during maintenance and alterations. Enclosed resistor banks also available . . . added safety for your men and protection for the resistors. For further information, write Dept. C213, Cutler-Hammer Inc., Milwaukee 1, Wis.

Cutler-Hammer's Non-breakable Mill Duty Resistors are the choice of Mill engineers everywhere



These extra rugged resistors were designed specifically for mill and crane applications where service is severe. Cutler-Hammer 11011 Mill Duty resistors are available in three standard widths and can be mounted independently or in a Staxrite mounting frame. Check these other important features of design and construction.

- Stamped chrome-steel grids
- Shock-proof
- Vibration-proof
- Corrosion-resistant
- Welded grid joints
- No pressure dependent grid contacts
- Staggered, projected terminals
- Welded grid-to-terminal joints
- Heavy duty mica insulators

CUTLER-HAMMER CONTROL C-H

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wis. • *Division:* **Airborne Instruments Laboratory.** • *Subsidiary:* **Cutler-Hammer International, C. A.**

Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.; Intercontinental Electronics Corporation.